Coal Age

OCTOBER, 1954

A McGRAW-HILL PUBLICATION—PRICE 50¢

Give the United Way!

COAL POLICY TODAY
14 points for a stronger industry ..... p 70

GLASS-BULB RECTIFIER
New low-cost unit highly efficient ..... p 75

NEW COAL BREAKER
Mine experience with chemical method ..... p 78

SERVICE FOR ALLEN
Modern facilities up face efficiency ..... p 82

EXTENSIBLE BELT
First 30-in model hauls 1,000 ft ..... p 96

Best way TO STAY IN THE BLACK!

In these days of high operating costs it's vital to mechanize. An acf Mine Car Haulage System is an important part of this mechanization. Here's why:

acf Mine Cars are designed and built to give the maximum in economical operation. Example: their drop-bottom action permits the unloading of *a ton of coal a second!* Breakdowns can't cause costly delays . . . an injured car can be quickly shunted to a siding, most often to be repaired *by your own men!* You get money-making 'two-way haulage'—men and supplies go into the mine, coal comes out.

Call your nearby acf Representative for the facts. Let him help you *streamline* your mine operations into the big money! acf Industries, Incorporated, New York • Chicago • St. Louis • Cleveland Philadelphia • Huntington, W. Va. • San Francisco Washington • Berwick, Pa.

acf **MINE CARS** *for Constant Haulage*

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

20 million tons in 14 years B. F. Goodrich belt still at work

IF you need a conveyor belt that will stand any kind of coal-handling job, whether above ground or below, B. F. Goodrich has developed just the belt for you. It's the B. F. Goodrich *cord* conveyor belt.

Layers of separate cords, each surrounded by rubber, run the length of the belt. This makes the belt strong to carry heavy loads, yet flexible enough to trough perfectly even if running empty. When the belt is slammed with heavy chunks, the cords "give"—roll with the punch—then the flexible rubber brings the belt back to normal carrying shape.

Every cord belt has double protection against mildew. If an accident should cause a cover cut and expose a cord ply, there are no cross threads to absorb and spread moisture that will weaken or rot the belt. The rubber surrounding each cord restricts moisture to the cut spot. In addition, the belts are treated with special chemicals which protect against mildew.

That's why the B. F. Goodrich cord belt in the picture has hauled 20 million tons in 14 years. Why it has carried all kinds of coal from razor sharp slivers to huge chunks without once causing a shutdown.

These are just a few of the reasons why the B. F. Goodrich cord belt designed for coal handling can do the job better, for less. For information on the full line of cord and fabric Caricoal belts, see your BFG distributor. He will show you how these longer-lasting conveyor belts can save you money. *The B. F. Goodrich Company, Dept. M-319, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

PREVENTION

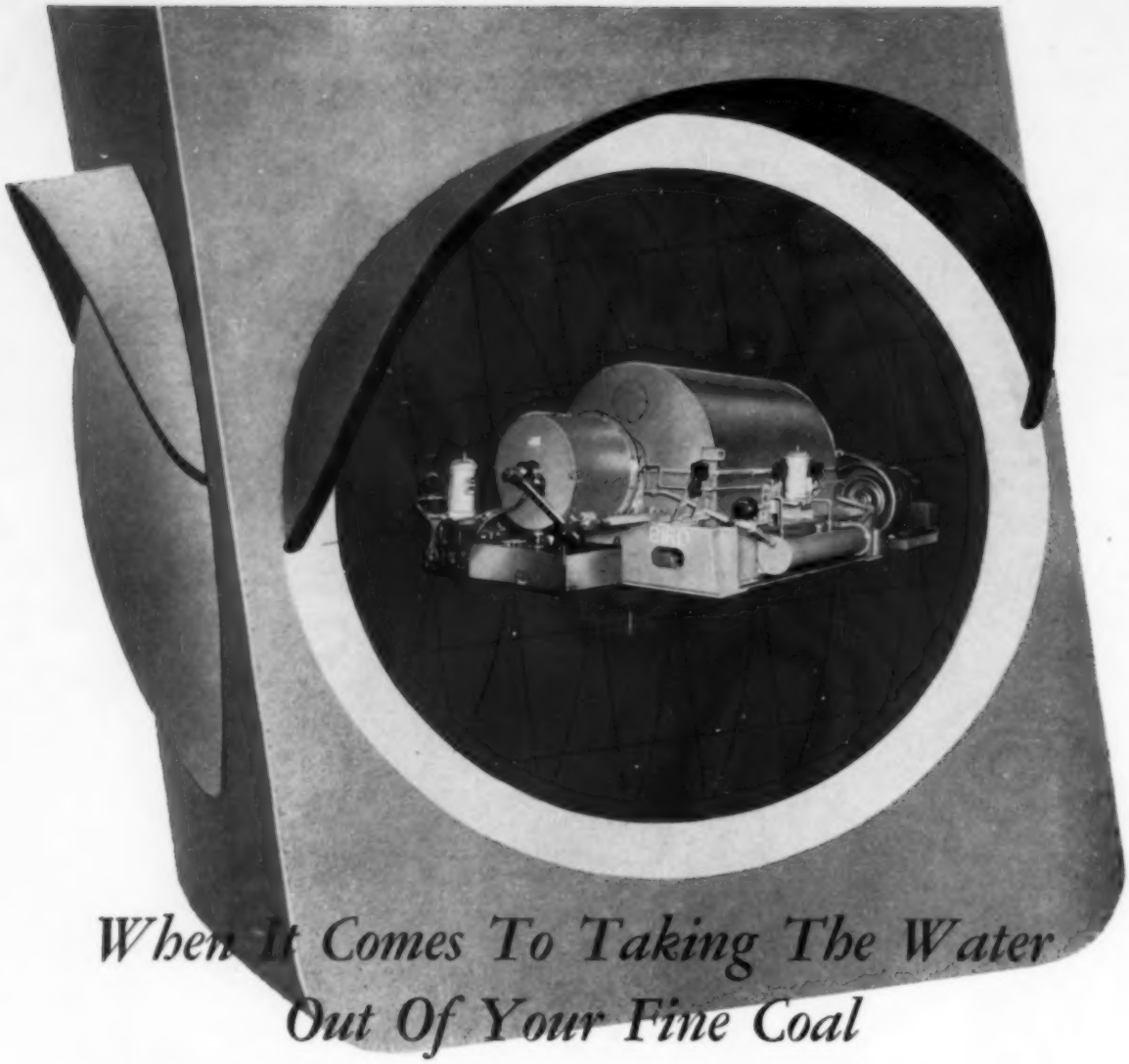
Our Chinese friends may have lots of wrong ideas. But their custom of paying the doctor to PREVENT illness sounds attractive. Especially when some "cures" consist of poking long needles into various sensitive key spots, as shown on the "chart" above.

HULBURT OIL & GREASE COMPANY
PHILADELPHIA, PA.
Specialists in Coal Mine Lubrication

costs less than CURE

Hulburt
QUALITY LUBRICANTS

You don't need Confucius to tell you it's cheaper to PREVENT machine breakdowns — due to poor lubrication — than to cure them. So why not let a Hulburt Lubrication Engineer "poke around" the key spots down in your mine and see to it that the one right quality lubricant — HULBURT — is used in the right way. That way you'll get the right results. And you won't be needled by high maintenance costs.



When It Comes To Taking The Water Out Of Your Fine Coal

WHY NOT DO IT NON-STOP?

BIRD COAL FILTERS run and keep on running day after day, month after month. No more shutdowns for screen replacement. No screening ahead of the feed to the BIRD, either.

The BIRD delivers up to a ton of fine coal a minute, and it's so dry it can be loaded direct or thermally dried at minimum cost.

Non-stop operation means low cost operation, too — as little as five cents a ton, with maintenance averaging less than two cents a ton.

How do *you* want to do this job, intermittently at high cost or *non-stop* at low cost?

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

Coal Age

OCTOBER • 1954

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No State Boundaries !

SUCCESSFUL MINING IDEAS don't stop at any one state line, nor do coal men in any one region have a monopoly on effective thinking. Progressive coal companies in every coal area are constantly on the lookout for new methods and new or improved equipment. Alert management officials know that, even if mining methods and seam conditions are different, there are many ideas from other regions that can be lifted wholehog or effectively adapted to their own properties.

In this issue, for example, there are no geographical limits to the significant ideas. From West Virginia, there's a highly efficient glass-bulb rectifier (p 75); a new method of breaking coal with chemicals in Illinois (p 78). Modern service helps high face output in Colorado (p 82). In Pennsylvania, an extensible belt hauls coal 1,000 ft from a continuous miner to the highwall (p 96), while in Oklahoma, a stripper uses a converted loading machine (p 100).

Next Month in Coal Age, Too!

Simultaneous stripping of two inherently different seams, a new preparation plant, a system that saves coal-handling costs for a good customer are the basic ideas to be covered in detail in three separate articles on Mine No. 19 of the Pittsburg & Midway Coal Mining Co., near Hallowell, Kan.

In Utah, a new approach to mining thick coal, made possible by roof-bolting, permits the United States Fuel Co. to work from the top of the seam down, for better recovery, greater safety and higher efficiency.

Boosting Big Chief—Installing high-capacity loaders and shuttle cars that boosted section efficiency 50%, following a new haulage portal and preparation plant, has completed South-East Coal Co.'s modernization of its Big Chief mine, at Seco, Ky.

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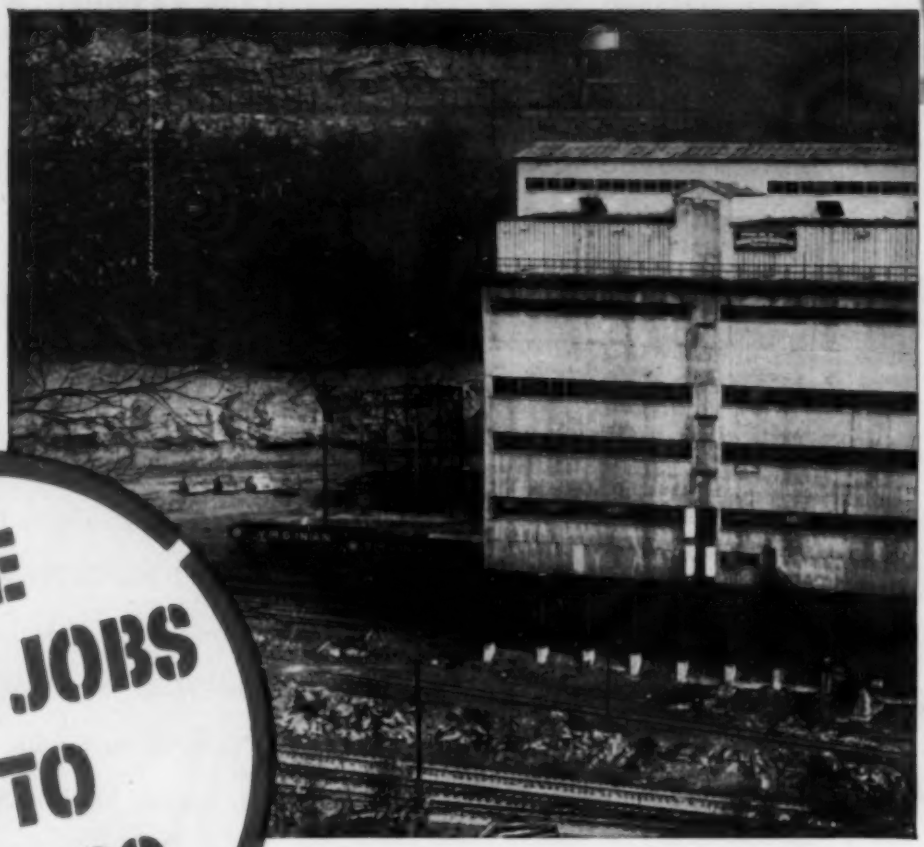


THE TOUGH JOBS GO TO TEXACO

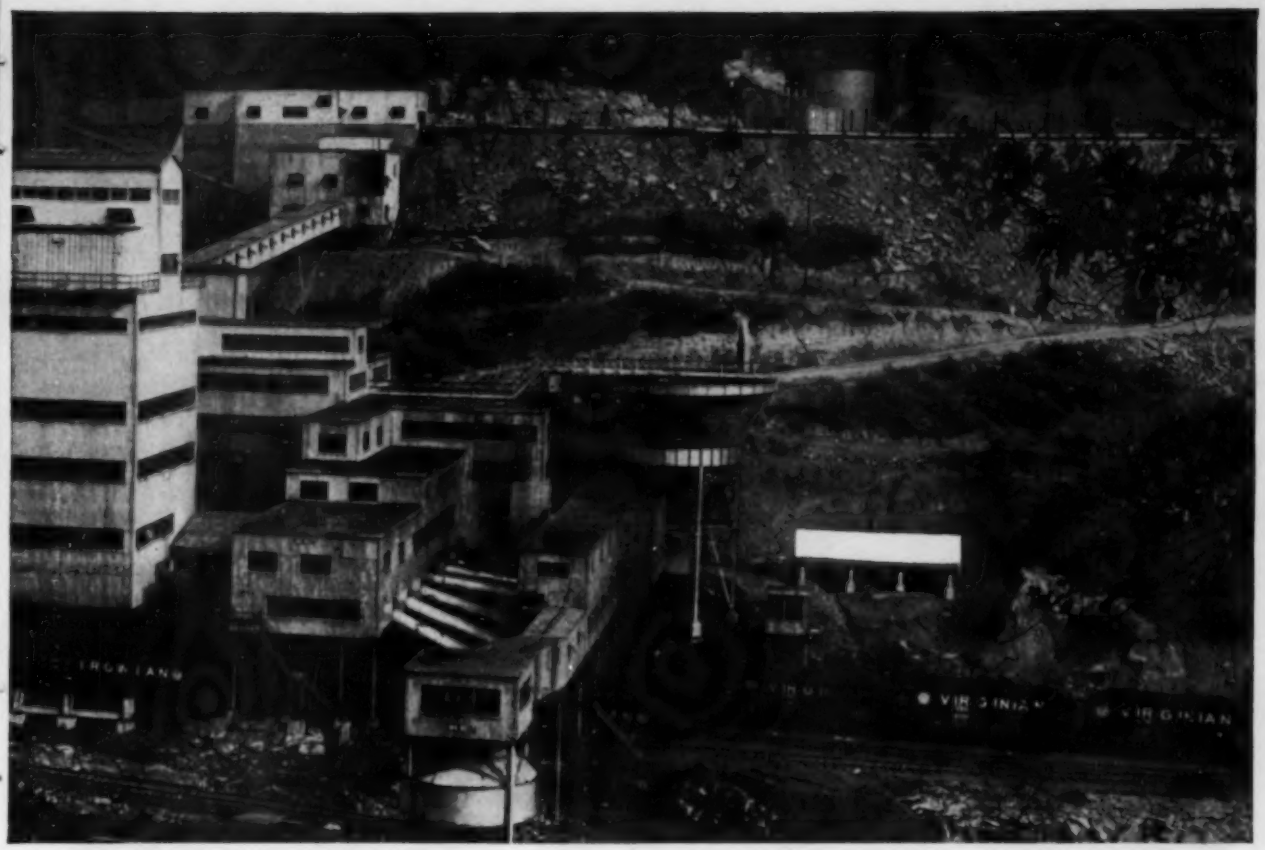
ITMANN PREPARATION PLANT . . .

handles all major lubrication with only 4 Texaco Lubricants

POCAHONTAS FUEL Company Incorporated has used Texaco mining lubricants exclusively for over 19 years. Results in high efficiency and low maintenance costs have been outstanding. So Texaco was naturally the choice for the company's Itmann (West Virginia) Mine and Preparation Plant—one of the world's most modern and efficient coal cleaning operations.

"We couldn't ask for better lubrication than Texaco gives us," **says Itmann Preparation Plant Superintendent, Guy Haynes.** ***"We've had no down time due to improper lubrica-***

TEXACO



tion since we started operating in February, 1951—and the fact that only four Texaco Lubricants handle all our major requirements really simplifies our lubrication procedure."

TEXACO LUBRICANTS USED AT ITMANN

Texaco Regal Oil R & O—an oil that tests show has *more than ten times the oxidation-resistance* of ordinary turbine-quality oils. Ideal for hydraulic mechanisms because it keeps systems free from sludge, rust and foam. Itmann uses *Texaco Regal Oil R & O* for enclosed gears, electrofluid drives and in the oil reservoirs of all pumps.

Texaco Regal Starfak—for grease-lubricated antifriction bearings. Has notable stability and resistance to oxidation. Itmann uses it in bearings of feeders, breakers, crushers, screens, conveyors, fans, dryers and electric motors, as well as for general grease lubrication throughout the plant.

Texaco Crater X Fluid—the world-famous Texaco Crater made fluid for added application convenience. Itmann uses it on all exposed gears, as on hoists and crushers. *Texaco Crater X Fluid goes* on as a liquid, *stays* on as a tough, long-lasting lubricating film that cushions shocks, quiets noise and reduces wear. Also excellent to keep wire rope strong.

Texaco Meropa Lubricant—an extreme pressure lubricant that Itmann finds ideal for lubricating the mechanisms and bearings of low head vibrating screens. Also recommended for heavy duty enclosed gears.

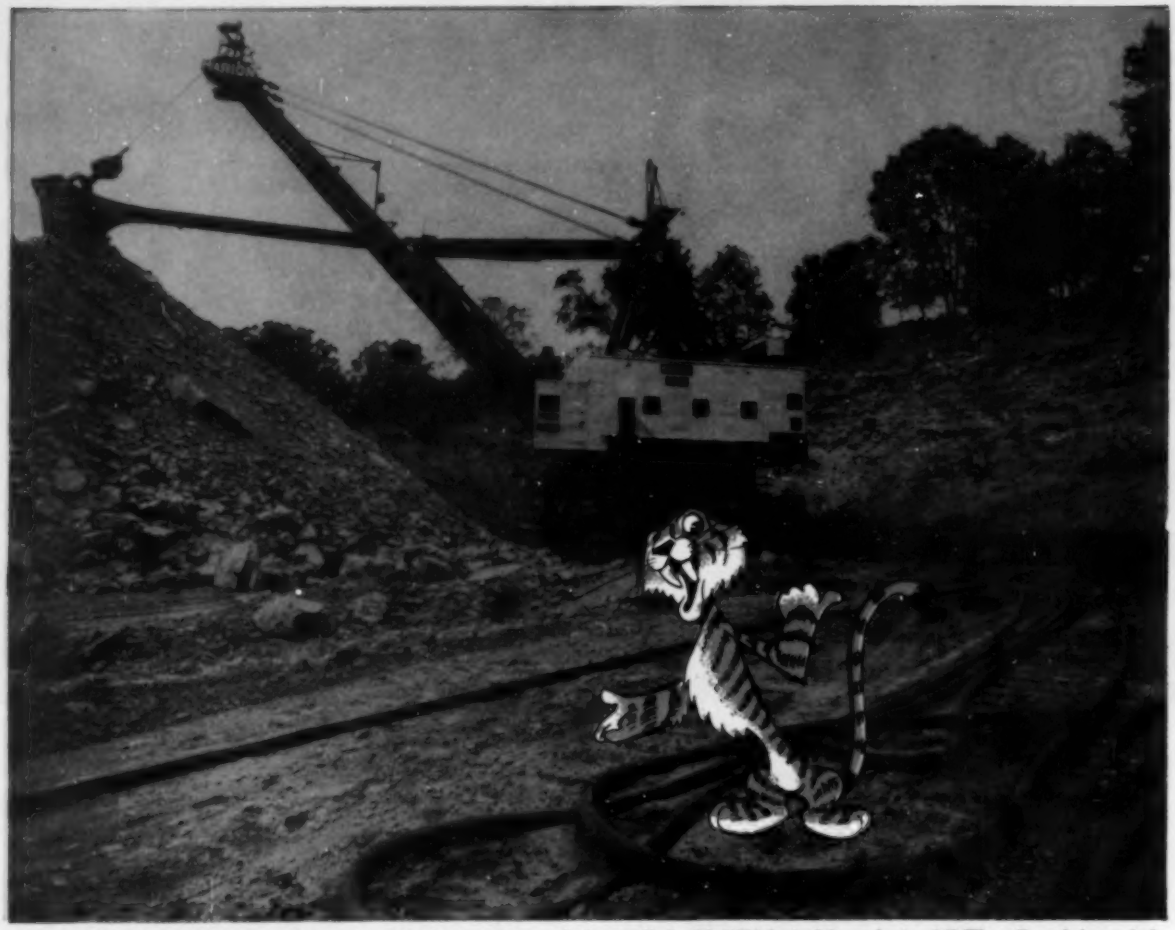
Let a Texaco Lubrication Engineer help you simplify and improve your lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

They needed a top quality cable



THE 18-CUBIC-YARD SHOVEL moves a lot of overburden in a hurry. It is supplied with 7500 feet of 3-conductor 1/0 Tiger Brand Amerclad.

HERE IS THE MINE HEADQUARTERS. Wash tower is at center. Notice conveyor system at right that goes to power station over the hill.

like *Tiger Brand* for this high production strip mine

HERE IS A PORTRAIT of the 45-cubic-yard shovel that has removed most of the overburden at this mine.

IF you take a ride out near Zanesville, Ohio, someday, you'll spot the new Muskingum Mine—probably the most modern strip mine in the world. It supplies coal for the new 400,000 kw Muskingum River Plant of The Ohio Power Company, part of the American Gas and Electric System.

The big 18 and 45-cubic-yard electric power shovels operate day and night through sun, rain or snow. And when you consider the eye-popping cost of lost production time, it's easy to see why these shovels need the most dependable power cable on the market. At this mine, it's 100% Tiger Brand Amerclad.

The cable is always exposed to foul weather and accidental abuse. It often stretches for more than a *mile* from switchgear to shovel take-up reel. Yet, after more than 2 years on the job, the Tiger Brand Amerclad is in perfect condition without sign of wear.

If you need a cable that can *take it* . . . if you want cable for a power shovel, dredge, mine locomotive, welding machine or a heavy-duty electrical hand tool—you'll get more for your money if you specify Tiger Brand Amerclad. Drag it through puddles, over sharp rock; spill gasoline or oil on it and expose it to sun and ozone. Tiger Brand will still give you service you never thought possible. *Send the coupon.*

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
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USS Tiger Brand — ELECTRICAL WIRE & CABLE

USS

UNITED STATES STEEL

Jeffrey 56-FH Drill mounted on High 70-UR. Drill is folded back as 70-UR positions for top cut.

725-53

Bugduster installed on Standard 70-UR. Note ample space between traction chain and tire — real protection for tire sidewalls if tire should go low and flatten toward chain.

558-54

A Standard 70-UR, below, makes a horizontal cut in a 6′ coal seam.

1103-53

Jeffrey 70-UR Universal Coal Cutter is available in four models, differentiated by tramming height and cutting range. Tramming heights are: Low, 30″; Standard, 34½″; High, 37¾″; and Extra High, 45″. Cutting range of Standard model is 11″ below floor to 7′9″ above, with the maximum height increased to 13′ on the Extra High model. All models can be duplicated in A.C. with slight differences in tramming height.

Among accessory equipment offered is the hydraulically driven Bugduster for taking cuttings away from the cutter chain automatically. A 56-FH face drill can be mounted on top of the 70-UR, making a two-in-one combination.

the Champ! JEFFREY 70-UR

CUTS COAL AND CUTS COSTS

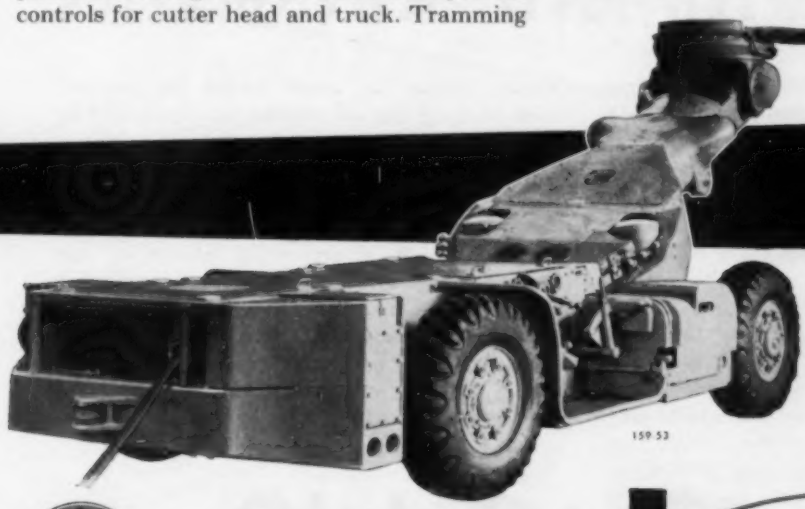
Mine superintendents call it "The Champ" . . . it's the Jeffrey 70-UR Universal Coal Cutter, engineered and built to produce more tonnage with less maintenance.

70-UR's rugged versatility pays off at the working face. Head and cutter bar can be rotated 360° in either direction, positioned to make any kind of cut any place in the seam. From one position it makes a 30′ horizontal cut (with a 9′ cutter bar) or a shearing cut 5′5″ to either side of centerline of machine.

Operators report smooth and positive traction for sumping even when cutting at extreme range. The 70-UR's wide wheel gauge, long wheel base, low center of gravity and large pneumatic tires give sure-footed stability. Dual controls for cutter head and truck. Tramming controls centrally located in operator's pit allow operator to face direction of travel. All operations hydraulically actuated (except cutter chain) for quick, positive, accurate response.

Maintenance men back this heavyweight champion . . . it has staying power that reduces down-time, cuts maintenance costs. Cutter chain and cutter chain drive are built for rugged duty. Cutter bar folds to protected position over top of machine for tramming. Shortens over-all tramming length to 21′3″.

Put punch in your mining cycle! Get full information on the 70-UR Universal Coal Cutter. Contact your nearest Jeffrey salesman or write to Jeffrey Mining Sales Division, today.



Cutter bar in top cutting position on Standard 70-UR. Note convenient location of dual controls.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA.

IF IT'S MINED, PROCESSED OR MOVED . . . IT'S A JOB FOR JEFFREY!

You haul up to 1000 lbs. more per car with S-D Automatics

● Here is what we mean: For example, if you were buying 14 automatic dumping cars of any other make with a seven-ton level full capacity, you would need only 13 S-D Automatics of the same overall dimensions to haul the same tonnage. You would save one car in every 14 — 8 percent in original investment . . . 8 percent in maintenance.

● Before buying bottom dumping cars, you should know that each S-D Automatic gives you ¼ to ½ ton more capacity for the same overall dimensions. This extra capacity is available only in S-D Automatics because of the construction features of Sanford-Day's exclusive S-D Automatic design. Any one of our sales engineers will demonstrate to your complete satisfaction just how we are able to give you this extra capacity.

● You should know too, before buying cars, that extra capacity is just one advantage of S-D Automatics. Others include: (1) the S-D "Twin Safety Latches" . . . two latches for safe and sure latching that are tripped simultaneously by the independently operated pair of tripping devices mounted between rails at bin. (2) The only bottom dumping car completely sealed against dust leakage. This big improvement gives you safer operation by preventing leakage of dust and enables you to eliminate the major portion of track clean-up costs. If you are planning for the future, let one of our men give you the full story. Write or call us today. *Sanford-Day Iron Works, Inc., P. O. Box 1511, Knoxville, Tenn. Telephone 3-4191.*

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KNOXVILLE • TENNESSEE

BROWN-FAYRO DIVISION JOHNSTOWN, PA.

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS CAR RETARDERS - SPOTTERS PUMPS - OIL SPRAY SYSTEMS

BIG CAR STRENGTH
in these
Goodman shuttle cars for low coal

TYPE 870 • BASIC HEIGHT 26" • AJDUSTABLE DISCHARGE

TYPE 670 • BASIC HEIGHT 32" • ADJUSTABLE DISCHARGE

These are tough little cars that have all of the rugged strength of the big Goodman shuttle cars. Many of their parts are similar and even interchangeable with those on the big cars.

They have more than adequate horsepower for quicktrip transfer of heavy loads; high capacity is available to handle surge loads.

Both the type 870 and type 670, of course, offer such standard Goodman features as 4-wheel drive, 4-wheel steering, 4-wheel brakes, hydraulic controlled cable reel, one- or two-speed conveyor chains, dual control in operator's cab, U. S. Bureau of Mines approval.

These cars are fully described in Catalog 5411. Let us send you a copy.

Goodman
MANUFACTURING COMPANY
Halsted Street and 48th Place • Chicago 9, Illinois

OTHER CABLE REEL CARS IN THE COMPLETE GOODMAN LINE:

Type 580, basic height 42", adjustable discharge
Type 582, basic height 42", fixed discharge
Type 570, basic height 48", adjustable discharge

Cutting Machines · Conveyors · Loaders · Shuttle Cars · Locomotives · Continuous Miners

He helped light the way to Safety

FOR MINERS EVERYWHERE

This month, the nation marks the 75th anniversary of Thomas A. Edison's invention of the first practical incandescent lamp. Giving added luster to this celebration is another of his great inventions . . . the first safe cap lamp for miners. Because his lamp eliminated the principal cause of mine fires and explosions—the open flame lamp—Edison called it his "most humanitarian invention."

M.S.A. has been world distributor of Edison Lamps since their introduction in 1915. Working with Edison Laboratories ever since, M.S.A. has continued to improve efficiency and construction. The cumulative result of this combined activity is the present Edison R-4—100 times brighter than the first Edison lamp. The R-4's contribution to underground safety and production is written in the records of its many users.

MSA
SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service . . . our job is to help you

MINE SAFETY APPLIANCES COMPANY
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At Your Service:
77 Branch Offices in the United States and Mexico
MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
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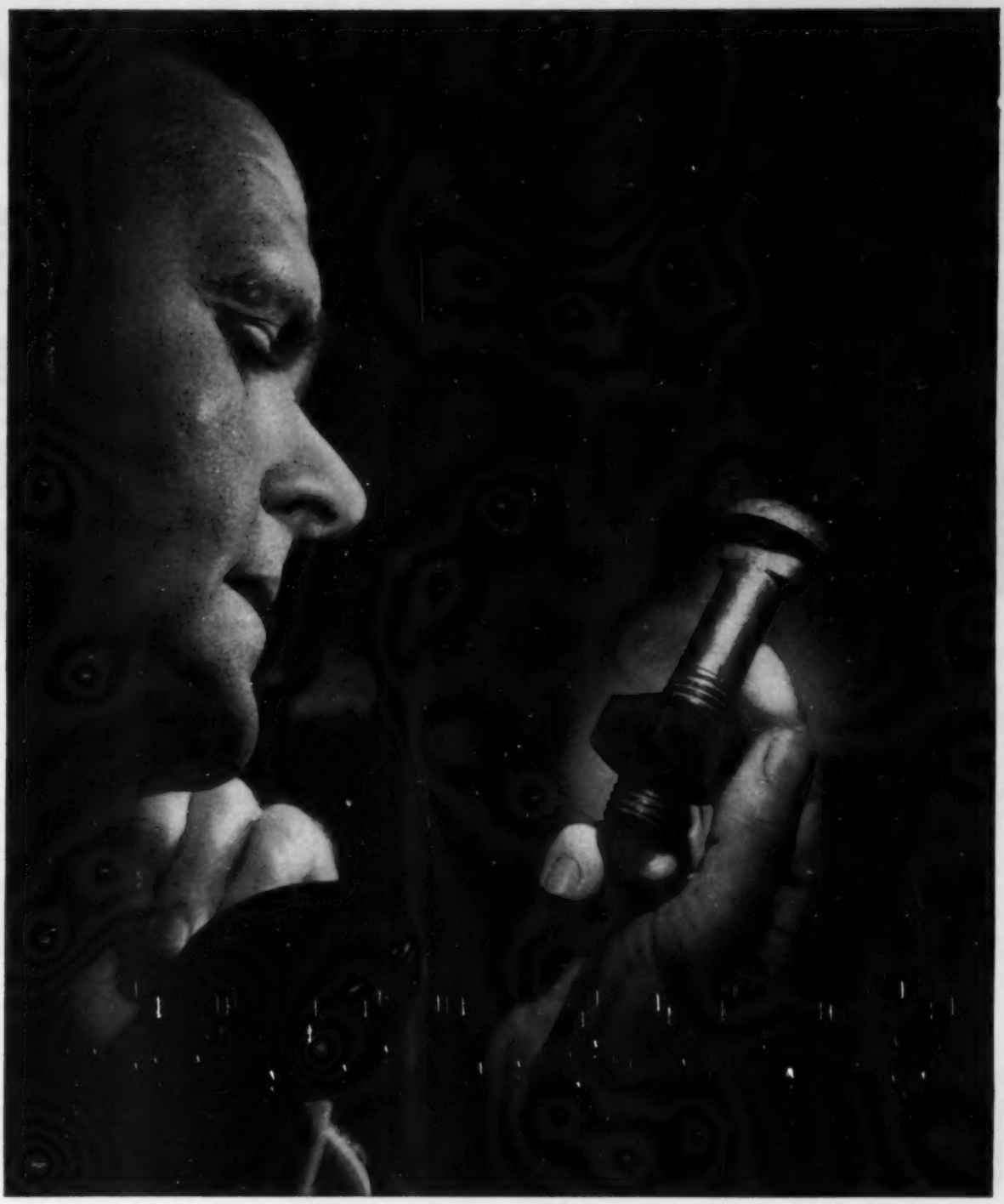
SERVING SAFETY
40
YEARS
1914 • 1954



"Satisfied with Bethlehem Track Bolts? You bet we are! They're top quality all the way."

Spikes and machine bolts, too!

BETHLEHEM STEEL

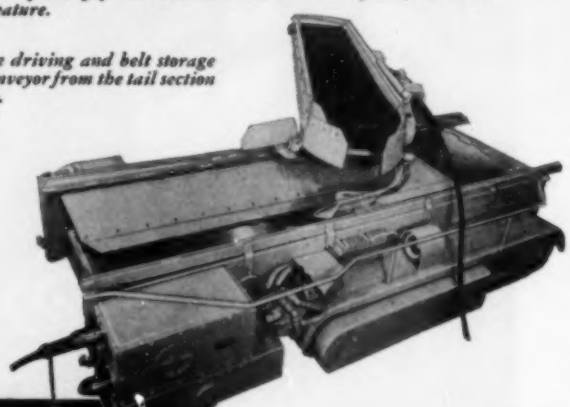
ANOTHER JOY FIRST!

E-X-T-E-N-S-I-B-L-E

FOR TRUE CONTINUOUS HAULAGE

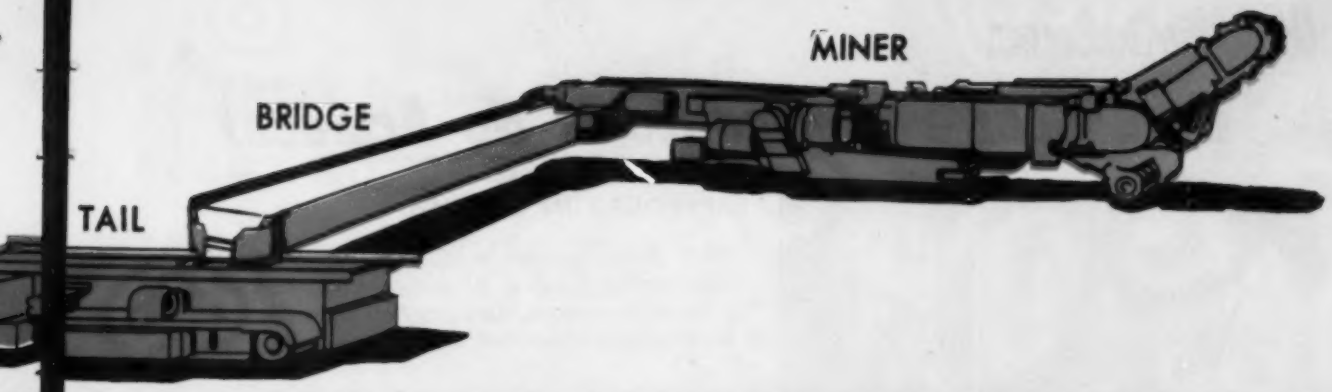
Above, the crawler-mounted driving section. At the rear is the first stand of the Joy "LIMBEROLLER" idler system, an exclusive feature.

Left, looking up toward the driving and belt storage section of the "Ex-Belt" Conveyor from the tail section (without Bridge Conveyor).



Above, tail section with full-length hopper, track-mounted sliding carriage, and Bridge Conveyor which provides a flexible connecting link from a Continuous Miner (see drawing at top of page).

As the Continuous Miner advances while mining a room of 16-foot width, a continuous stream of coal moves away from the tail section and up the "Ex-Belt" Conveyor toward the camera. Note the perfect troughing of the belt and the smooth, steady action of the LIMBEROLLER idlers, rotating with practically no waver. Along the rib, note how the required idler stands and side rails for a 15' section of the belt stack compactly between timbers.



BELT CONVEYOR

FROM CONTINUOUS MINING MACHINES

EXTENDS OR RETRACTS 50 FT. UNDER FULL LOAD

With the Joy "Ex-Belt" Conveyor, once again we have broken into new ground in our continuing development of the science of mechanized mining. Once again a Joy field-proved unit gives you a real opportunity to make another important reduction in your production cost-per-ton . . . the saving you need to maintain or increase your profit margin today.

The Extensible Belt Conveyor now, *for the first time,* gives you a continuous haulage system for Continuous Miners in driving rooms and entries up as far as 1,000 feet, including breakthroughs and taking pillar on retreat. Available in 24", 30" or 36" widths, it consists of two main units: a driving section and a tail section, both of which are self-propelled on identical crawler treads. It extends or retracts 50 feet while operating under full load, and belt tension and slippage are under automatic control at all times. A 100-foot length of belt can be added or removed, as needed, in an average time of only 5.3 minutes; and the entire system can be moved over and set up for a new heading in less than 2 hours.

Perhaps most important of all, the Extensible Belt Conveyor follows the Joy tradition of simply-designed, rugged, foolproof equipment that can take the heaviest duty underground and stay on the job month in and month out. That is your final assurance of securing the favorable cost basis and production rates for which the Joy "Ex-Belt" was developed. ***Joy Manufacturing Company Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ont.*

WRITE FOR BULLETIN J-303

TYPICAL FIELD PERFORMANCE

In an Eastern Ohio mine, operating in 54"-60" coal (Ohio #8 seam), a Joy Continuous Miner and Extensible Belt Conveyor team permitted the driving of rooms 16 ft. wide to a depth of 600 ft. Average production rate for panels of seven rooms varied from 302.3 to 325.4 tons per shift. Average time required to change over equipment was 1¾ hours (from shut-down in one room to start-up in the next).

Consult a Joy Engineer

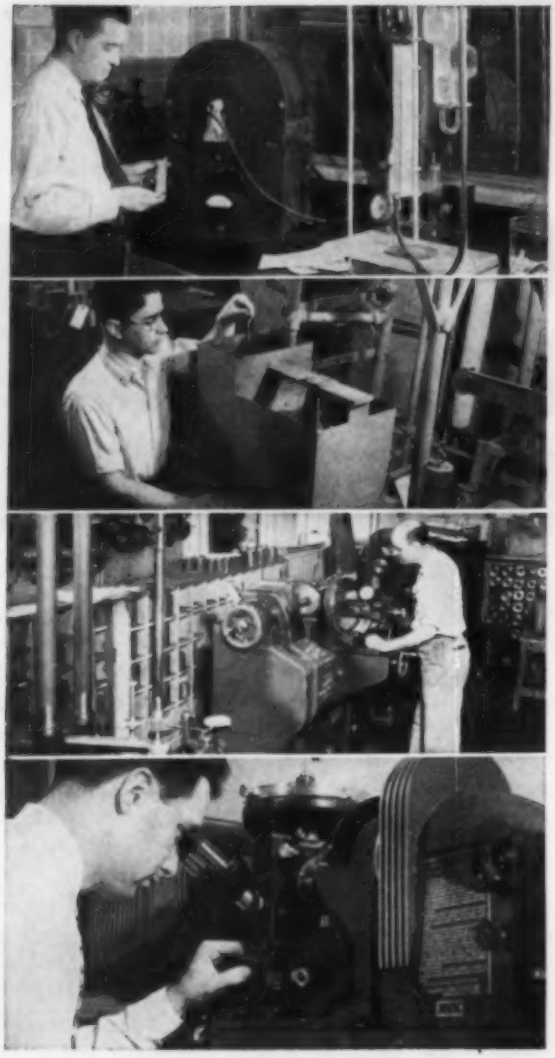
JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CLB362

At Allis-Chalmers

Good Gear Performance is No Accident



APPROVED IN THE LAB

From design through production, Allis-Chalmers engineers know their gears inside and out. Here are a few of the modern laboratory tests and inspection techniques by which their quality is controlled:

Carbon Content Test

With this apparatus, Allis-Chalmers engineers can determine the carbon content to within .01 percent. Steel must have correct carbon content to insure heat-treating to proper strength and hardness.

Quench Test

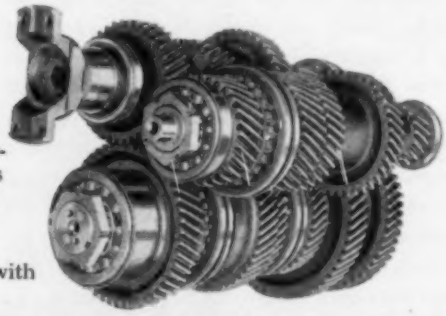
To help insure complete control over the quality of finished gears, all steel must meet specified hardening characteristics, determined here by the "End Quench Hardenability Test."

Dimension Test

Cutting tools used to make the gears, as well as the gears themselves, are measured in the gear laboratory. With this precise dimension control, Allis-Chalmers can mass-produce gears that are correct to 1/10,000 of an inch.

Metal Grain Test

Sections cut from finished gears are examined under metallurgical microscopes which magnify from 10 to 2,000 times. This test gives assurance of proper and uniform quality of grain structures in hardened gears.



PROVED IN THE FIELD

The final and most important test for any gear is its performance under actual job conditions. In Allis-Chalmers tractors, motor graders and Motor Scrapers, the quality of their gears is proved by long, efficient service on the toughest earth-moving jobs.

Technical and practical experience like this, coupled with the most modern heat-treating and manufacturing facilities, adds hours of maintenance-free performance to Allis-Chalmers earth-moving equipment.

Write for complete literature on any unit in the Allis-Chalmers line.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

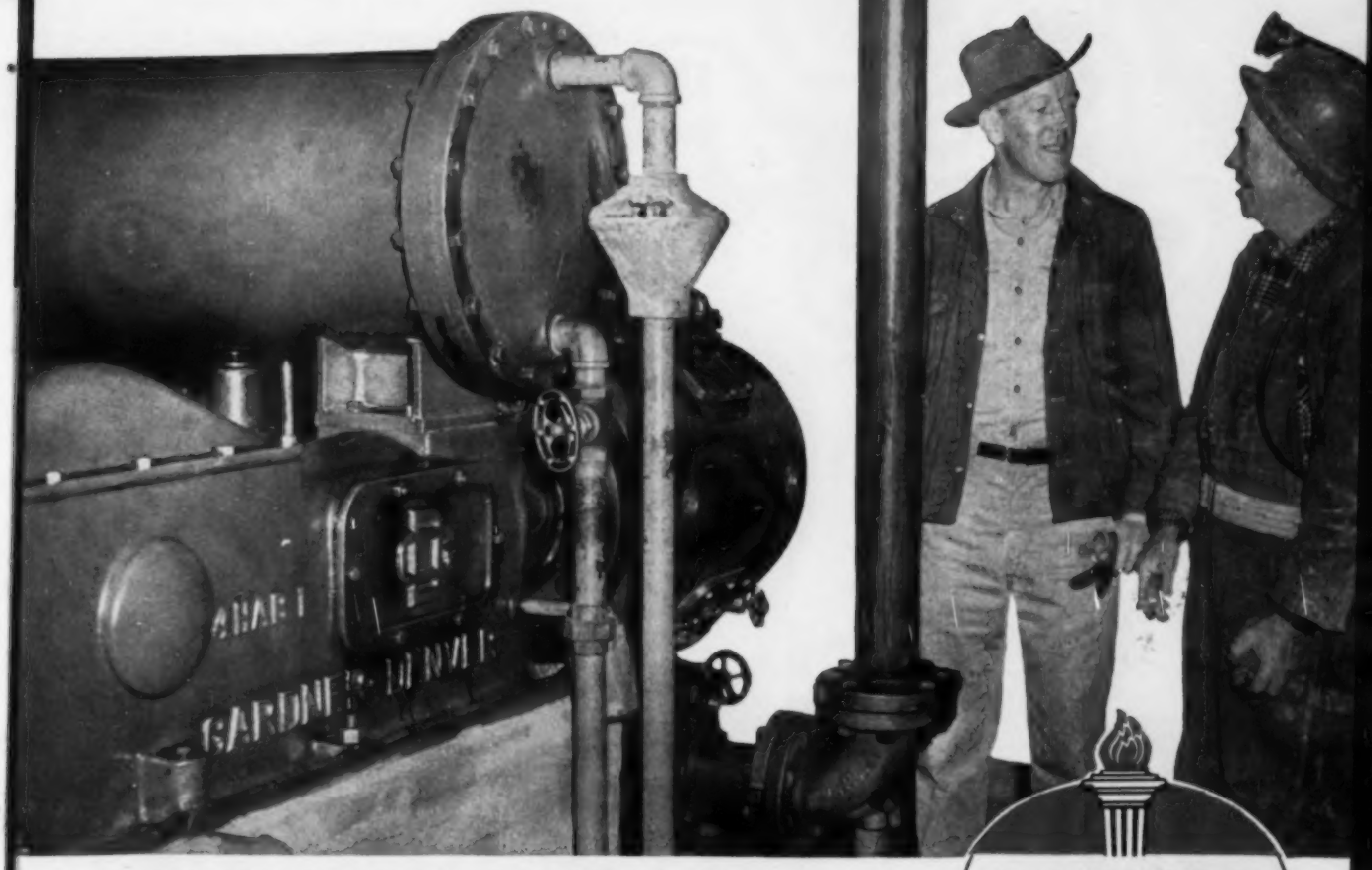
12 years of the right oil keeps air compressor . . . .

■ Keeping this air-compressor trouble-free and always on the job is a "must" at General Chemical's fluorspar mine located near Boulder, Colorado. Under rough conditions of fluctuating loads the compressor supplies air for air tools, rock drills, slushers and other vital mining tools.
Constant operation calls for an oil that will keep wear to a minimum . . . and assure trouble-free compressor out-put to keep these tools working.
In a recent twelve year stretch, STANOIL #31 was the oil relied on to keep this unit on the job.
At the end of this period the engine was taken down for inspection. With this hard-working oil assuring day-in day-out protection these were the findings. There were no carbon deposits and no cylinder wear. Protection had been so thorough that the rings showed *no signs of wear whatsoever!* In fact, they were in such like-new condition that they were put back into use!

STANOIL
TRADE MARK
Industrial Oil

. . . GOOD AS NEW!

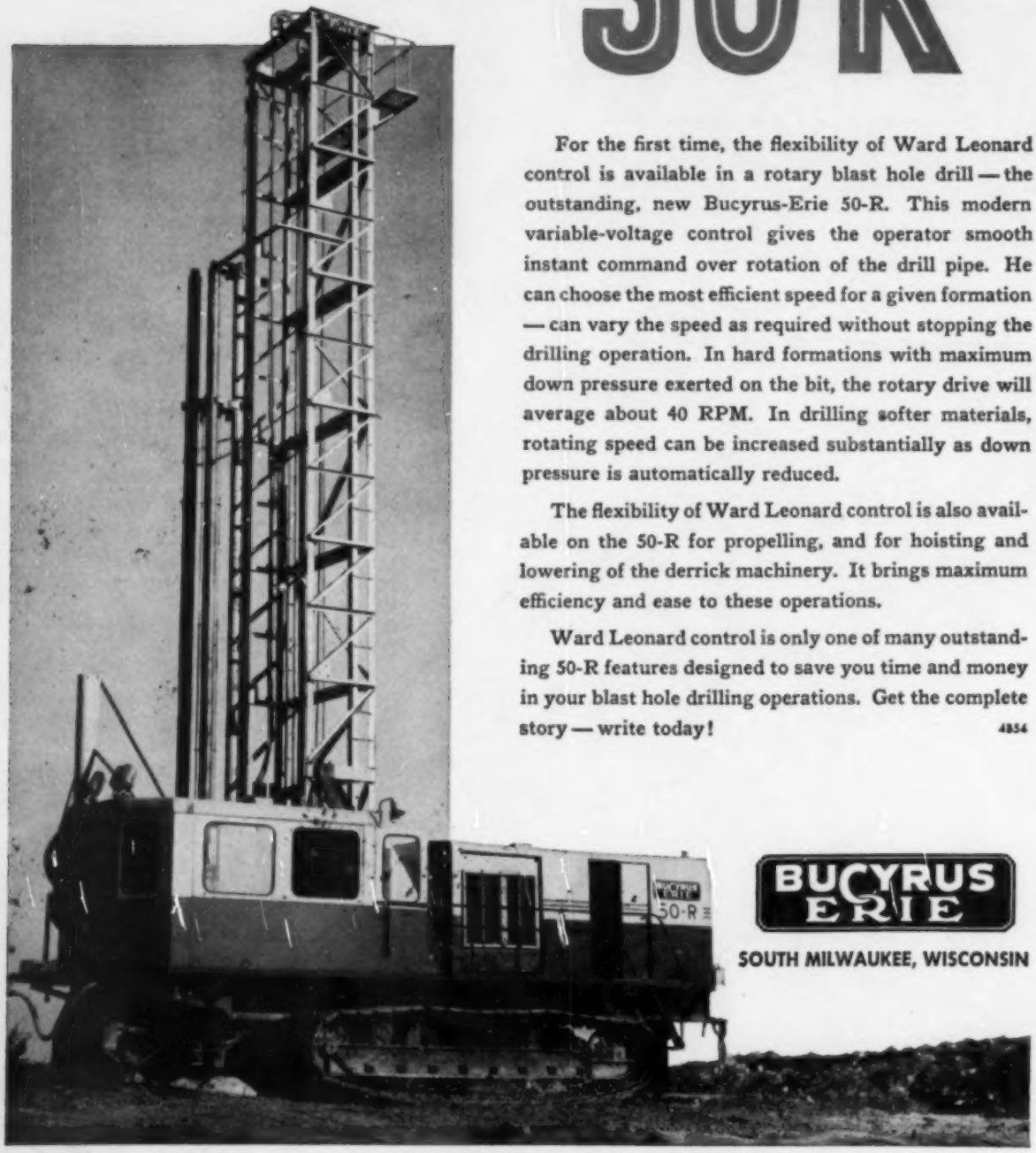
This is Standard Oil's E. K. Arnston who helped General Chemical save time and money with superior lubrication. For help like this call your nearest Standard Oil office or write to Standard Oil, Chicago.



STANDARD OIL COMPANY (*Indiana*) **STANDARD**

Your Choice of Drilling Speeds for Maximum Footage

BUCYRUS-ERIE 50-R



For the first time, the flexibility of Ward Leonard control is available in a rotary blast hole drill — the outstanding, new Bucyrus-Erie 50-R. This modern variable-voltage control gives the operator smooth instant command over rotation of the drill pipe. He can choose the most efficient speed for a given formation — can vary the speed as required without stopping the drilling operation. In hard formations with maximum down pressure exerted on the bit, the rotary drive will average about 40 RPM. In drilling softer materials, rotating speed can be increased substantially as down pressure is automatically reduced.

The flexibility of Ward Leonard control is also available on the 50-R for propelling, and for hoisting and lowering of the derrick machinery. It brings maximum efficiency and ease to these operations.

Ward Leonard control is only one of many outstanding 50-R features designed to save you time and money in your blast hole drilling operations. Get the complete story — write today! 4854

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

"Look what rib-pinching does to our shuttle car cable!"

"Sometimes the cable gets cut almost in half. And that's dangerous to the men. So we have to shut the machine down to make a splice. That costs money. Run-overs, rock splinters and sharp corners between the face and the main tunnel are tough on the cable! How can we make our cable last longer under these conditions?"

"Well, a few simple things can help you double cable life."

"First, careful handling is most important at all times. Another thing, avoid run-overs. A broken sheave or guide is a gamble. Don't pinch the cable on the roof, rib or bottom . . . and don't buy cable on price alone. *One break can cost you more than you can possibly save!*"

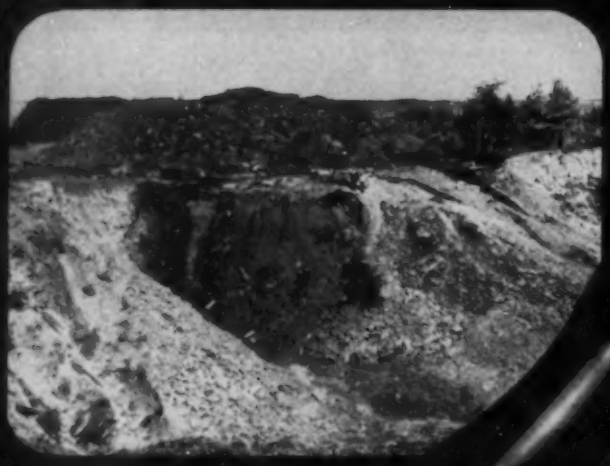
Here's why AnacondA shuttle car cables last longer

Did you know that recent surveys in 15 mines show ANACONDA flat-twin cables today last 300% longer than cables used on shuttle cars only a few years ago? Here's why. These cables have a *specially-compounded* neoprene jacket. You can't cut, tear or abrade it easily. Insulation is a new, harder-wearing form of cold rubber. An improved stranding, and a brand-new ground strip make this cable a lot tougher and a lot safer to handle.

Ask your Anaconda or distributor salesman to show you why you'll get more life out of this new cable—more safety—and more real economy. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.* 64388

the right cable for the job **ANACONDA®**
WIRE AND CABLE

Break it up to bite size...with APEX®



VERSATILE APEX explosives are an important factor in the amazing improvements in breakage now possible with the newest Atlas development . . . Alternate ROCKMASTER® combined with Alternate Velocity Loading.

Apex is an economical ammonium nitrate explosive with a patented assembly having a water-proof gelatin core that offers these advantages:

- **The water-proof core promotes complete detonation of the explosive in wet holes.**
- **Complete propagation of the column in any height face.**
- **Fluted-end cartridge permits easy loading.**
- **A wide range of strengths and velocities to choose from. Apex is available in 8 strengths: each in low, medium and high velocity.**

For maximum breakage, better control of throw and economical production, team APEX explosives with the ROCKMASTER Blasting System.

For complete information on all Atlas Explosives Products, ask your Atlas representative for a copy of the new Atlas Explosives Catalog.

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

Goodyear Quality Pays Off Again:

Coal-Flo—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

THEY DOWNGRADED COSTS TWO WAYS

with this 3-stage, power-generating conveyor

HAULING coal from pit to tipple was a serious problem at this Rocky Mountain mine. Six miles of treacherous, mountain-shelf road made costs and hazards high. Particularly since temperatures ran as low as 40 below and annual snowfall as high as 150 inches.

Solution came with the help of the G.T.M.—Goodyear Technical Man—in the form of a half-mile system of conveyors. Three 42″-wide belts quickly and safely carry the coal down grades averaging 27% at the rate of 250 tons per hour. Over 750,000 tons have been hauled in four years with virtually no maintenance.

And induction gear-motors at the tail pulleys convert the energy, created by lowering the coal some 700 vertical feet, into electric power to run the dragline and other equipment. A double savings!

See the G.T.M. for similar help with your haulage problems. Contact him through your Goodyear Distributor or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the Yellow Pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

COMPLETELY ASSEMBLED
FACTORY ADJUSTED
PRE-LUBRICATED

SEALED

—ready to mount on the shaft!

DODGE-TIMKEN *America's Quality Pillow Block*

Extra measures are taken to build superior quality into Dodge-Timken Bearings; and extra precautions are taken to keep that quality *intact*—from the factory to distributor to you to your machines.

These bearings are sealed in manufacture—an integral part of Dodge-Timken design. Their inbuilt precision is protected *both on and off the shaft.* That is one reason why they easily deliver a minimum of 30,000 hours of service. Want evidence? Look around you. No other pillow block is so widely used on the nation's tough jobs. Dodge-Timken dependability has been proved in *millions* of installations.

There are 5 types of Dodge-Timken Pillow Blocks for all types of service, in shaft sizes from 1 3/16" to 10". Also Dodge-Timken Hanger Bearings, Flange Bearings, Take-ups.

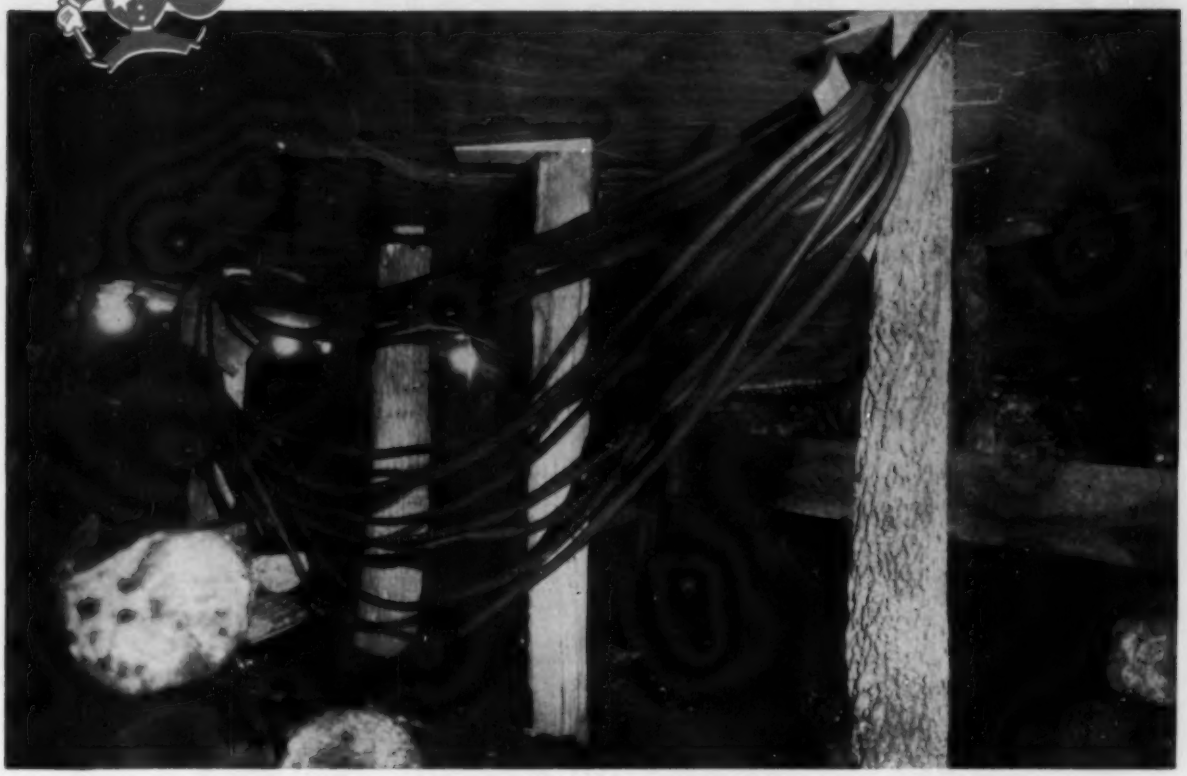
DODGE MANUFACTURING CORPORATION, 3000 Union St., Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

Banish Idle Cable from Your Mine



This is one way many mines keep power cable for cutting, drilling, and loading machines out of harm's way. As the working area is extended, more cable is pulled off the posts. This method is expensive in cable, labor, and power costs.

If you use power centers and Simplex-TIREX PG and PCG Cables, you can avoid scenes like this and save money. As the working face advances, you couple together additional lengths of TIREX. You use only as much cable as you need.

Simplex-TIREX PG and PCG Cables provide you with all of the famous TIREX features — the cured-in-lead jacket, the Selenium Neoprene Armor, the flexible stranding, and "P-101-BM" markings. Service-tested TIREX is the best quality mining cable money can buy.

To permit rapid moving and reduced electrical hazards, install power centers. To get economical, dependable, long-lived PG and PCG Cables, specify TIREX. To find out more about TIREX, write to the address below for Catalog 1011.

Simplex

TIREX CORDS AND CABLES *are made only by the*

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge 39, Mass.

Cleveland-Cliffs Iron Co. reports:

Belts reinforced with Du Pont "Cordura" give trouble-free performance 16 hours a day

Over-all view of Canisteo Mine conveyor-belt system. Belts reinforced with Du Pont "Cordura" carry crude iron ore up this 18° slope . . . hug the center idler for better troughing and training throughout the run.

Steady production at the Canisteo Mine, Coleraine, Minn., depends on the performance of conveyor belts like the one shown above. The belts, reinforced with Du Pont Cordura* High Tenacity Rayon, transport an average of 900 tons of crude iron ore from pit to wash plant every hour—stand up well under rugged 16-hour workdays.

The Cleveland-Cliffs Iron Co., which operates the mine, reports that the "Cordura" reinforced belts have given highly satisfactory service since their installation. Manufactured by the B. F. Goodrich Co., the belts have needed no maintenance to date. The *extra* strength of Du Pont "Cordura" permits a belt that's thinner, yet stronger. And the low stretch of "Cordura" reduces expensive downtime for take-up and resplicing.

Consider "Cordura" before ordering *your* next conveyor belt. Write us for names of suppliers . . . and send for your *free* copy of the new booklet "Mine & Quarry Facts About 'Cordura'." Address: E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U.S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

COORDINATED PLANNING RESULTS IN

Something Extra

WITH EVERY

FAIRMONT

PREPARATION PLANT

For more than half a century Fairmont Machinery Company has been producing coal handling and preparation plants with "Something Extra"! "Something Extra" which is the direct result of painstaking coordinated planning plus responsibility. Here, then, are the reasons why a coal preparation plant by Fairmont is a model of top operating economy and notably increased separating efficiency—both of which lead to the upgrading of your product . . . a vital factor in pleasing today's discriminating coal buyers.

TURN TO FAIRMONT for the "Extras" which will put you out ahead:

1. *Coordinated, qualified engineering, fabricating and erecting.*
2. *Choice of equipment best adapted to your specific requirements.*
3. *Skilled pilot crews to smooth out operational "know-how" of your own men.*
4. *A competently-planned installation for your present needs with provisions to cope successfully with future demands.*

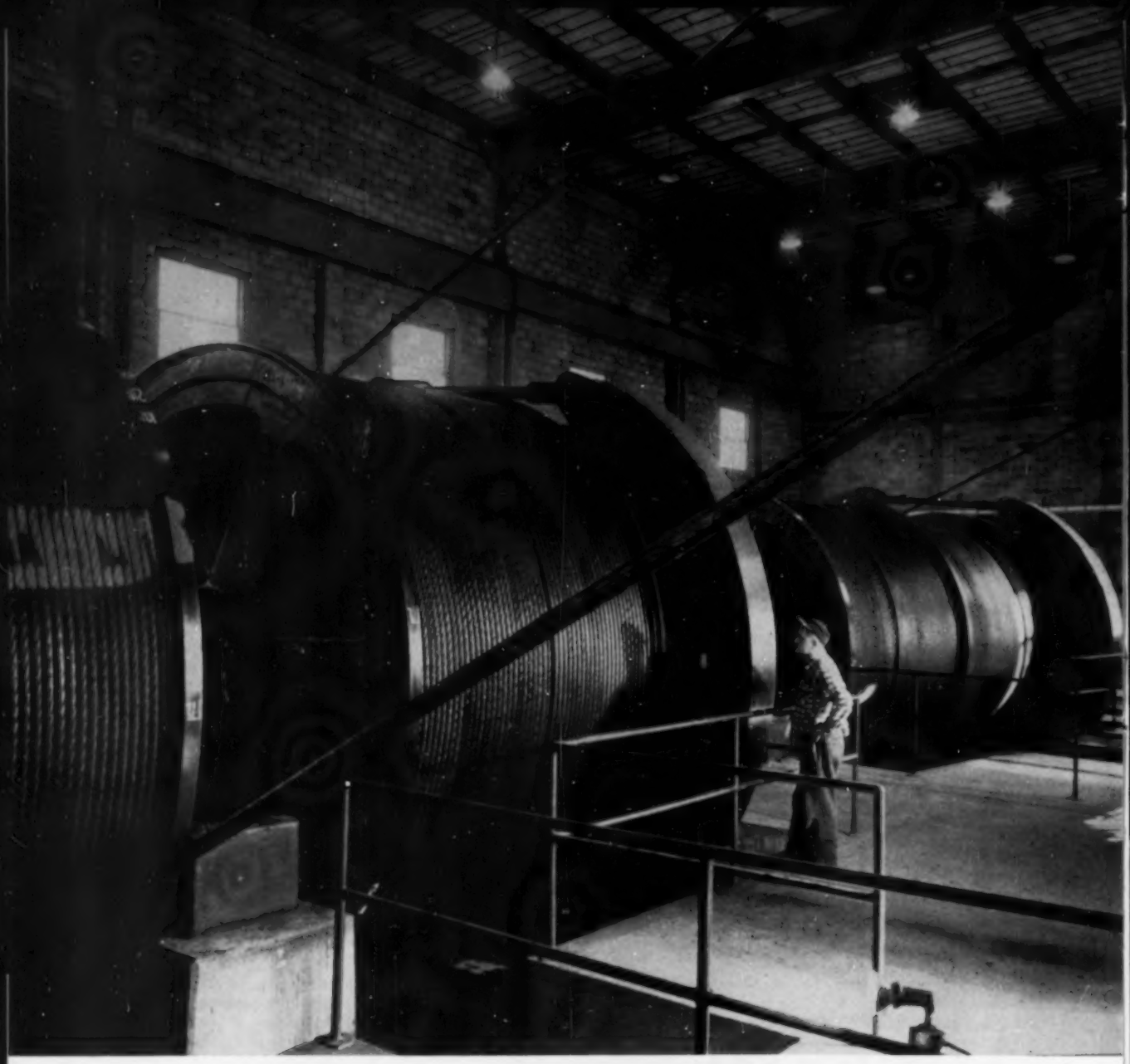
If you have a knotty preparation problem—if you want a plant which will turn out a guaranteed uniform product and give you over 99% separating efficiency through a product size range of ⅛" to 10" in any tonnage capacity—

Call A FAIRMONT engineer.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.



Wire Rope at Work—In northern New Jersey is the Mt. Hope iron mine of the Warren Foundry & Pipe Corporation. It is a model of good housekeeping and mining efficiency, as this view of the hoist house indicates. The hoisting apparatus consists of two separate installations, one of which operates the balanced ore skips, the other a man-and-materials cage.

Depth of the shaft is 2750 ft, and levels are at 1700, 2100, and 2500 ft. The skip travels at 1800 ft per min; the cage, 800 ft per min with personnel, 1200 when carrying material. The handling of the heavy loads is entrusted to Bethlehem wire rope, Purple Strand grade, and almost three miles of this sturdy rope is used on the two hoists. Here Purple Strand is doing its usual reliable job, meeting every demand of the rigorous service with plenty to spare.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

COMPTON Model 48 Coal Auger

Recovers coal up to 208 ft. from the pit wall

. . . regardless of overburden

The Compton Model 48 Coal Auger is designed to give you maximum efficiency at low cost. CHECK THESE FEATURES!

1.—Auger sections racked on frame—ready for transfer to operating position by hydraulically controlled synchronized winches in a matter of seconds.

2.—Hydraulically-operated pilot pan eliminates spillage between machine and high wall.

3.—Entire unit is self-contained including elevating conveyor.

4.—Hydraulically-controlled swivelling discharge turret chute permits uniform trimming of trucks.

5.—Hydraulic jack legs (with self-leveling pontoons for better floatation) permit drilling up to 208 feet without misalignment . . . also permits drilling vertical overlapping holes for varying seam thickness.

COMPTON CUTTING HEAD

EXCLUSIVE WITH COMPTON AUGERS . . . BUILT-IN SPIDER ASSEMBLY ON NON-CLOGGING HEAD RESULTS IN INCREASED PRODUCTION BY DRILLING STRAIGHTER HOLES WITH LESS FRICTIONAL DRAG.

MODEL 48 SPECIFICATIONS

Length: 48 feet; Weight: Approx. 36 T.
Carries eight 26 feet auger sections.
Required pitwidth: 50 feet
Power: 300 HP Diesel Engine
Hydraulic frame jack lift: 66" or 120"
Auger diameters: 28" to 48"
Possible drilling depth: 208 feet

Consult a Compton Engineer for Details

Compton, Inc.

ORIGINATORS OF COMPTON JUMP RECOVERY HEADS

BOX 1946 — PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

JEFFREY cast pulleys are better

Jeffrey Cast Iron Pulleys insure the most efficient and economical belt conveyor operation because:

- **They are more resistant to corrosion, abrasion and rust.**
- **They do not require absolutely stiff shafts.**
- **"Clamp" type hubs really grip shaft, avoid key seat wear.**
- **Heavy *machine-turned* rims are more accurate.**
- ***Machine-turned* faces are truly concentric.**
- **Variable hub positions on shaft meet all special conditions.**
- **Lagging can be vulcanized or secured with lock nuts which won't back out.**
- **Machined crown faces aid belt training, are accurate and uniform.**

Jeffrey Pulleys are cast in one piece from highest quality grey iron. There is a type and size to meet every belt conveyor requirement . . . including single or double arm, solid or clamp hubs, and extra-heavy units for high-tension belts.

Jeffrey Cast Pulleys have given trouble-free and continuous service on outstanding conveyor jobs for more than 30 years. They hardly ever wear out!

JEFFREY BELT CONVEYOR EQUIPMENT INCLUDES:

Belt Idlers — *all types*	Drive Chains
Pulleys	Pillow Blocks
Gears	Sprockets
Shafting	Couplings
Set Collars	Holdbacks
Takeups	Belt Cleaners

WRITE FOR CATALOG NO. 852

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED . . . *IT'S A JOB FOR JEFFREY!*

The McLANAHAN Black Diamond Double Roll Crusher

. . . A Low Cost Sturdy Crusher for reduction of Coal—Lime—Cinders and other similar Crushable Materials

Gear guard is supplied with crusher. Photo shows guard removed.

Designed as a relatively inexpensive yet sturdy crusher for accurate sizing of the crushed product, the McLanahan Black Diamond Double Roll Crusher is available in 18″, 24″, 30″ and 36″ diameter rolls with roll widths from 18″ to 60″ for handling various feed sizes and capacities. Cast steel or semi-steel gears with extra long teeth provide adjustments in crusher opening. Anti friction bearings.

Write today for complete data.

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

Hollidaysburg, Pennsylvania

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Screw Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.

"'Monobel'® AA breaks our drawslate down clean ... makes work safer, more efficient"

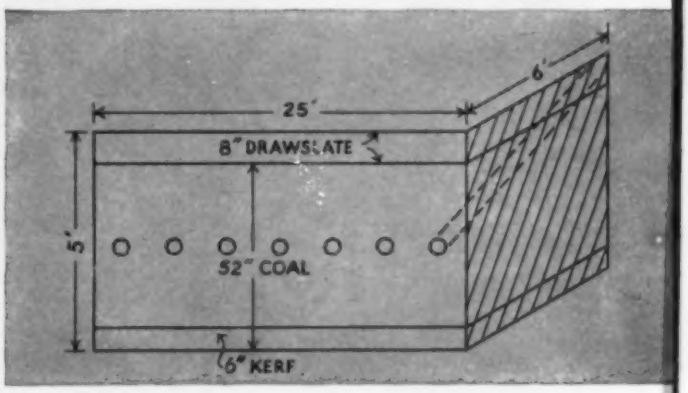
Reports Supt. Clyde Daniel, Twin Seam Mining Co. of Kellerman, Ala.

"There's a peculiar condition of 8" drawslate in our mine," Supt. Daniel explained, "which used to give us a lot of trouble. After each shot we'd have to go in and knock the slate down by hand—a dangerous, time-consuming job. It's no problem, though, since we switched to 'Monobel' AA. This permissible brings most of the slate down with the coal—makes work safer, more efficient. Now we can move right in, post it and start drilling holes, with practically no lost motion." Photos of shot in mine's Brookwood Seam underscore Du Pont "Monobel" AA's advantages.

1. Getting ready — Supt. Daniel inspecting tamped-up room before shot. (This section of the seam is 52" thick.) Charges of Du Pont "Monobel" AA have been loaded into drill holes. Note the 8" layer of drawslate.

2. Coarse coal and well-broken slate are the result—and "Monobel" AA's a big factor behind it. This permissible shears the back and ribs clean . . . pushes coal and slate out so loaders can quickly handle them.

3. Room cleaned up, ready for cutting. Here you can see the clean-sheared back and rib. Supt. Daniel summed it up this way: "With 'Monobel' AA, we're able to drill sooner, load faster, *and* in safety."



4. Technical service men from Du Pont assisted members of the Twin Seam Co. in developing this highly effective drilling pattern. All rooms are undercut, with holes angled up to penetrate the drawslate.

The only way to convince yourself about something is to try it. So test Du Pont "Monobel" AA in your own mine . . . check it for breakage, fumes and water resistance. We think you'll agree with many other owners and operators: "It's a permissible you can depend on." For complete details on "Monobel" AA, get in touch with the Du Pont Explosives representative in your district. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT

PERMISSIBLES

Blasting Supplies and Accessories

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Cuts and loads 7 tons of coal per minute, with TIMKEN® bearings taking tremendous thrust loads

ITS cutting arms rotating at 14 rpm, the rugged Goodman 500 Miner slugs 13′2″-wide paths through solid, unprepared seams, cuts and loads up to 7 tons of coal per minute.

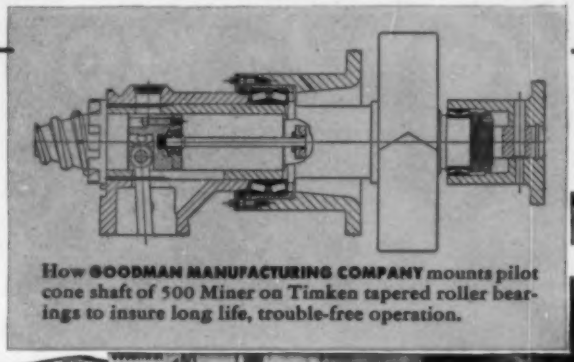
The main work of cutting is done by a pair of auger-like pilot cones and six long cutting arms that hold the bits. Taking the tremendous thrust loads on their shafts are Timken® tapered roller bearings.

Heavy shock loads set up by high speed cutting are handled easily by Timken bearings. Rollers and races are case-hardened to give them tough, shock-resistant cores and hard, wear-resistant surfaces. And line contact between rollers and races gives Timken bearings extra load-carrying capacity.

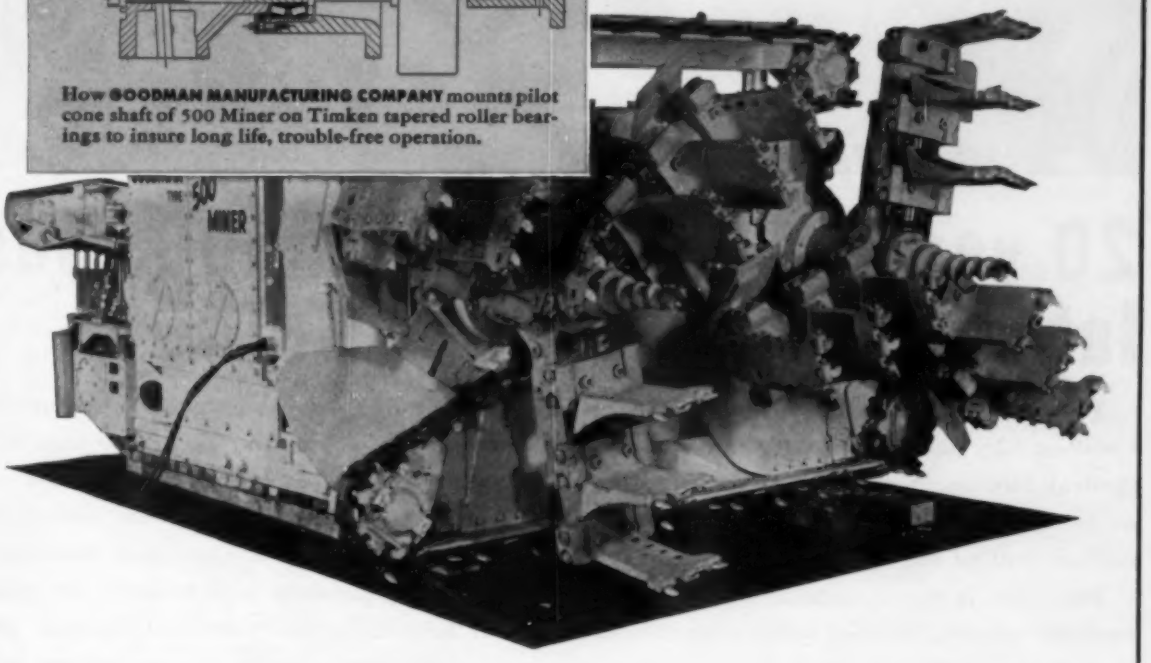
Particularly important for mining machines, working under a constant stream of coal, are effective closures. Timken bearings help make closures more effective by holding housings and shafts concentric. Lubricant stays in, dirt and coal dust out.

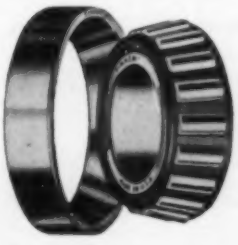
In no other bearing can you get the combination of advantages which Timken bearings give you. Specify Timken bearings in the equipment you build or buy. Look for the trademark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **GOODMAN MANUFACTURING COMPANY** mounts pilot cone shaft of 500 Miner on Timken tapered roller bearings to insure long life, trouble-free operation.





TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

PROFILOGRAPH TRACE, GOOD COMMERCIALLY GROUND FINISH (5,000 X VERTICAL, 50 X HORIZONTAL)

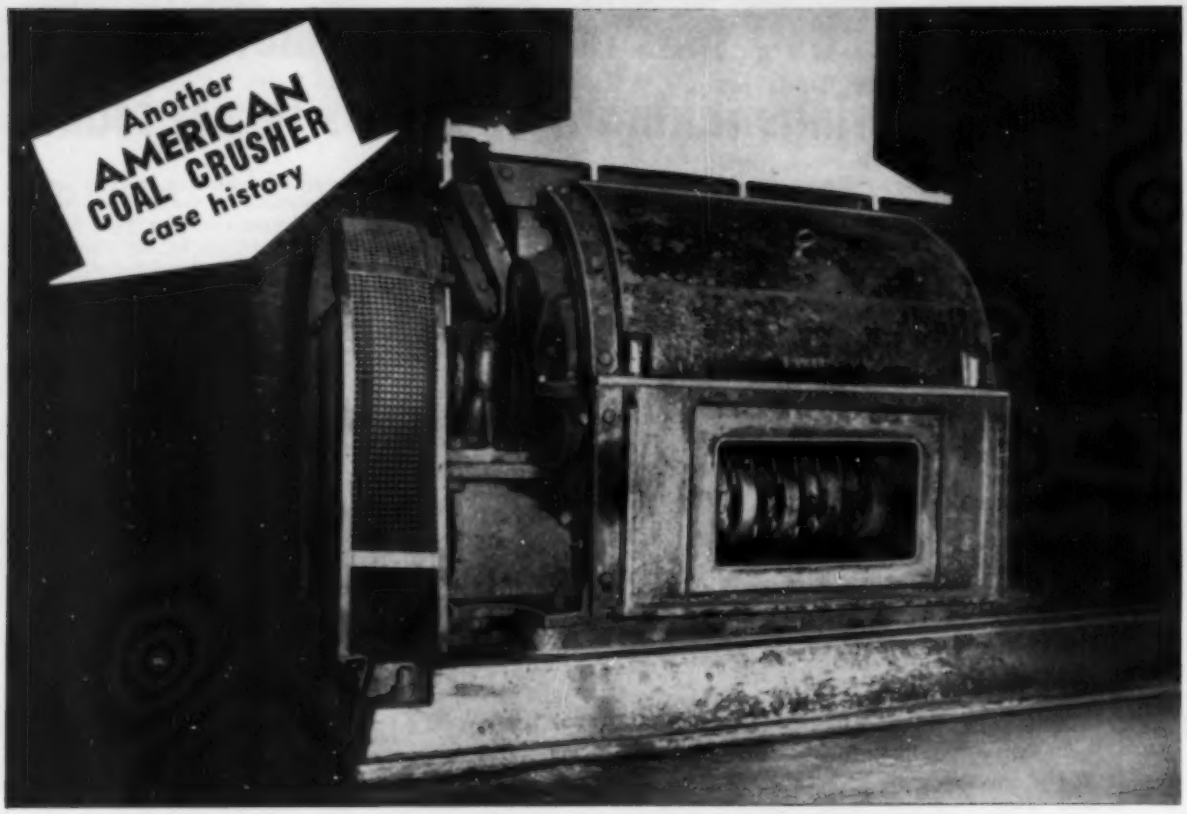
PROFILOGRAPH TRACE, TIMKEN BEARING FINISH (5,000 X VERTICAL, 50 X HORIZONTAL)

OPTICAL FLAT, PERFECT FINISH

SMOOTH TO MILLIONTHS OF AN INCH

Surface finish of high quality Timken bearing rollers and races is so smooth that it takes a profilograph to measure its smoothness. This instrument measures surface variations to a millionth of an inch, as shown at the left.

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION



20 years . . . and 6,000,000 tons later: STILL GOING STRONG

Yes, over 2 decades ago this American Crusher 42S was installed in a New Jersey Central Station. Since then, it has continuously and faithfully crushed more than 6 million tons of coal.

But here is the eye-opening part of this enviable record: During this entire 20-year period, the total parts replacement cost per ton of coal crushed has been only $.00025. (In other words, *40 tons for a penny.*)

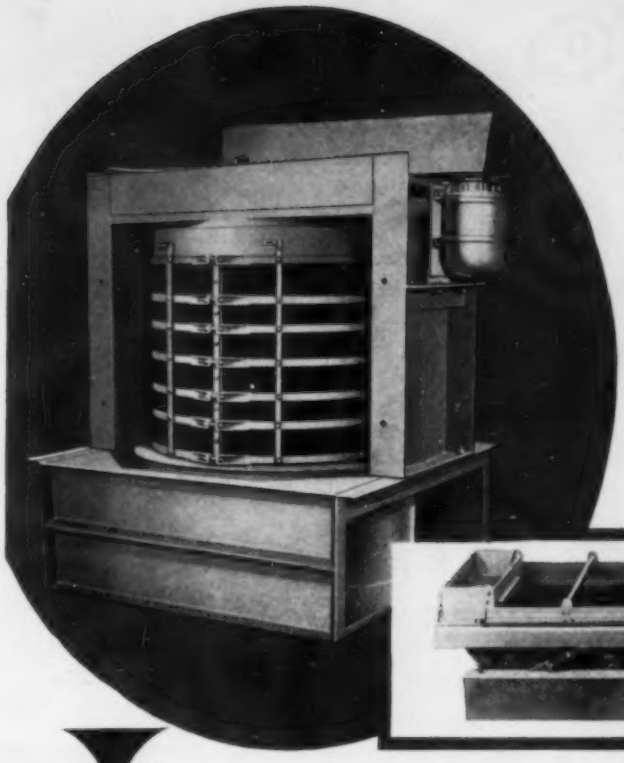
Even more convincing proof of American Crusher *quality* is the fact that this is a *typical case history* — not an isolated example. An extensive independent survey has revealed over and over again that Americans consistently produce high tonnage for years —at amazingly low parts-cost figures. Discover for yourself why Americans are preferred everywhere for performance, for dependability, and for economy of operation.

WRITE for special "AC Coal Crushing Bulletin"

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE.
ST. LOUIS 10, MO.

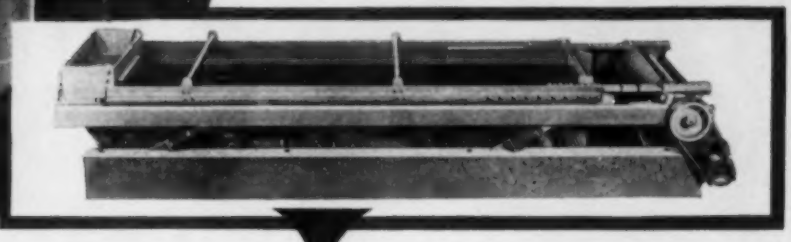


for Better Coal Preparation

. . . SPECIFY

SYMONS® SCREENS

. . . in sizes and types for every coal preparation problem . . . wet or dry screening — sizing — rescreening — dewatering or dedusting.



● ***SYMONS "V" SCREENS*** . . . effectively combine centrifugal and gravitational forces. Important advantages include: HIGH CAPACITY—EXTREMELY ACCURATE SIZING, EVEN IN THE FINER MESHES—HIGHLY EFFICIENT DEWATERING—FULLY ENCLOSED—DUSTLESS OPERATION—FULLY ACCESSIBLE—MINIMUM FLOOR SPACE REQUIRED—ECONOMICAL OPERATION.

● ***SYMONS HORIZONTAL VIBRATING SCREENS*** . . . in a wide range of sizes and types, all featuring: LESS BREAKAGE AND DEGRADATION OF EVEN THE MORE FRIABLE COALS—GREATER UNIFORMITY IN GRADED SIZES—WIDE RANGE OF SEPARATIONS—SIMPLE, LOW COST INSTALLATION—LOW MAINTENANCE COST—EASILY ENCLOSED, WITH ENTIRE DRIVE MECHANISM OUTSIDE DUST AREA.

SYMONS SCREENS have been serving the coal industry for almost twenty years, in many hundreds of screening applications throughout the world. These quality screens have gained an enviable reputation for dependability, efficiency and economy . . . backed by the same high standards of accuracy, design and workmanship, and the same advanced engineering that is used in the manufacture of *all* Nordberg Machinery.

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

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NORDBERG MFG. CO., Milwaukee, Wisconsin
Please send me further information on the following screens for coal preparation service:

☐ Symons "V" Screens ☐ Symons Rod Deck Screens
☐ Symons Horizontal Screens ☐ Symons Grizzlies

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

5454

No place for little ideas...

In large scale mining, the problems are big and ideas for solving them must measure up. Experienced strip mine operators know that Bucyrus-Erie stripping shovels and draglines offer the right answer — really big output, along with dependability and economical operation. In addition they provide long working ranges, time-saving maneuverability, and the basic simplicity of design that means low maintenance costs.

If your mining operation requires the economical handling of big yardages, investigate Bucyrus-Erie stripping shovels and draglines. 16L54

BUCYRUS ERIE

South Milwaukee, Wisconsin

Photograph by Howard Lucas

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Wherever the stroke of the detonator sets the earth shaking, American blasting materials help speed the work.

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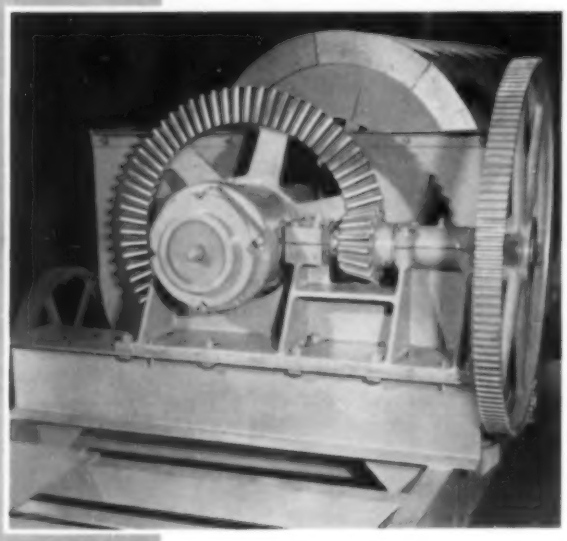
how

AKINS

leadership in mechanical performance can help you cut costs

Classifiers and heavy media separators are selected on the basis of low-cost-per-ton output resulting from efficient, dependable mechanical and metallurgical performance. That's why so many successful mining companies throughout the world continue to order *and reorder* Akins.



for example...

the gears

- **Meehanite metal gears**
  the bevel gear and spur gear are made of Meehanite metal. With Meehanite it is possible to obtain definite pre-determined and uniform properties to best meet the requirements of each application. Its uniform density, high tensile strength, and fatigue strength provide special qualities of toughness and resilience.
- **faced bevel gear and bevel pinion**
  the Meehanite bevel gear and cast steel bevel pinion have faced teeth...they run smoother and quieter, last longer.
- these features, like the patented submerged bearing and rugged main shaft, result in more efficient operation—thus, low-cost-per-ton production.

WRITE FOR CATALOG

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FIRTHITE "Blue Bit" MINING TOOLS

Designed with sintered carbide cutting edges on both sides as well as the point to reduce tool wear, binding and power consumption.

We've made it easy for you to get the best! Now, in almost every coal mining district in the country you can get the famous "Blue Bit" carbide tipped mining tools by telephoning your nearby Austin Powder representative where all necessary grades, sizes and styles are stocked for *immediate delivery.*

These Firth Sterling "Blue Bits" have proved, time and again, that they can reduce mining costs by minimizing down time, provide maximum tool life, and outperform conventional tools in the toughest applications.

When you need carbide tools, specify Firthite "Blue Bits," the tools with the strongest braze known; when you want prompt service and delivery phone your Austin Powder representative.

R-898

Manufactured by

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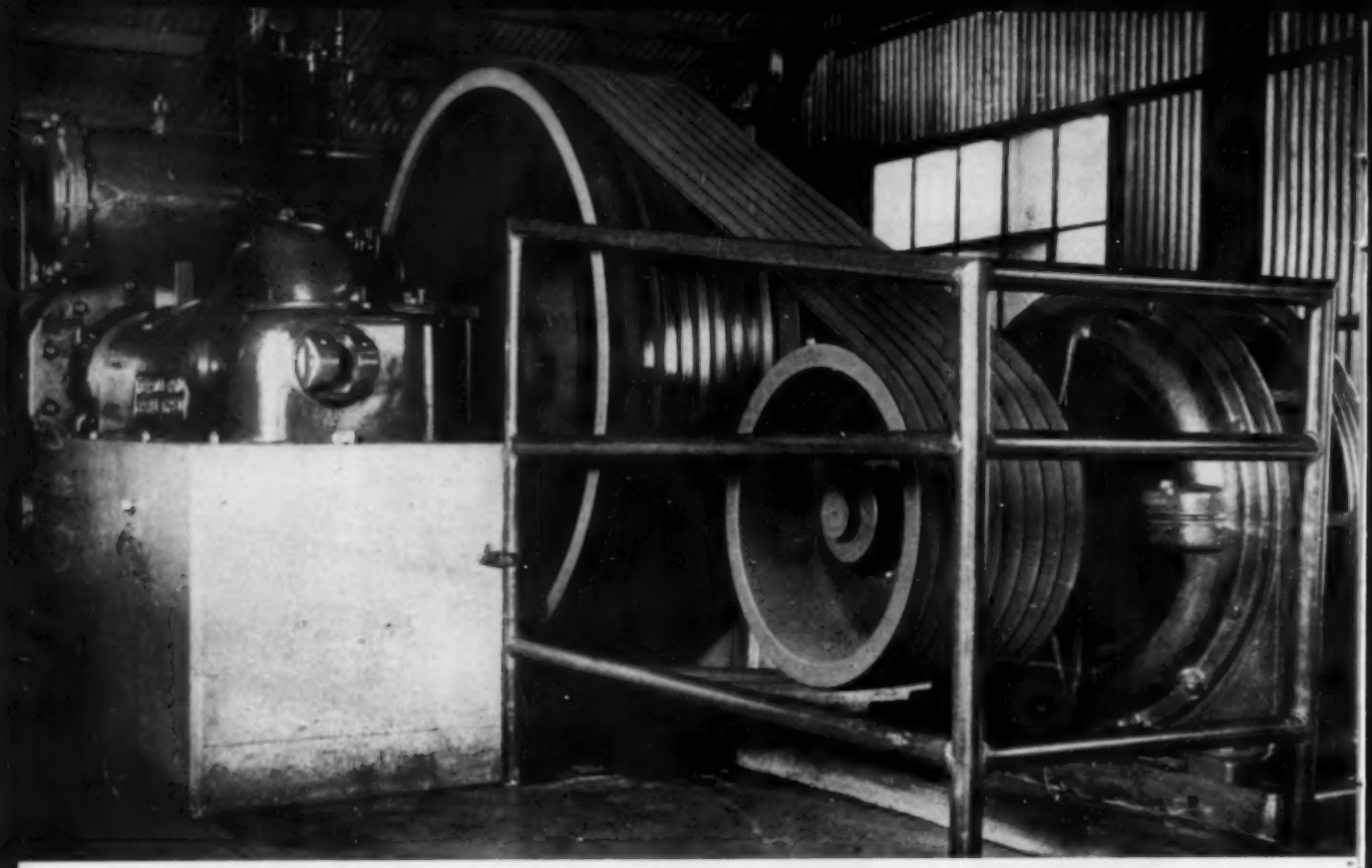
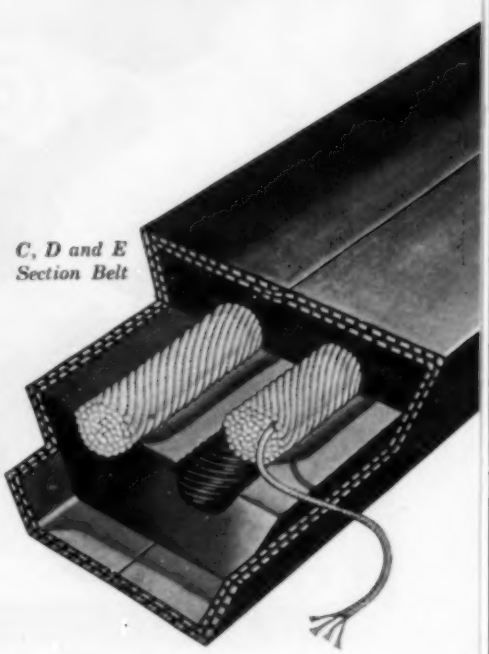


Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every mining application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of mining service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



C, D and E Section Belt

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

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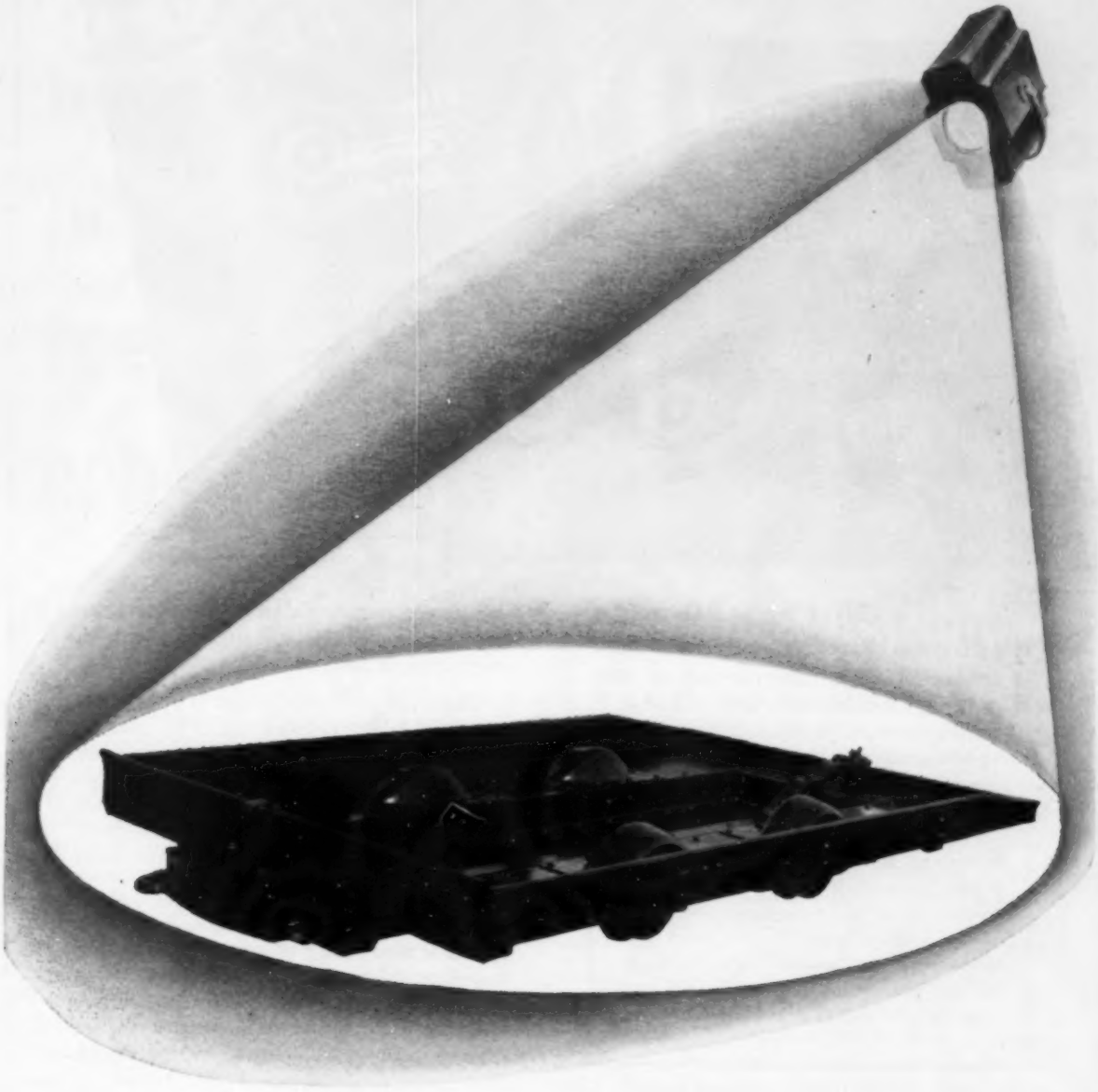
55 YEARS

CUSTOM-ENGINEERED
MINE CARS . . .



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BRISTOL, VIRGINIA - TENNESSEE
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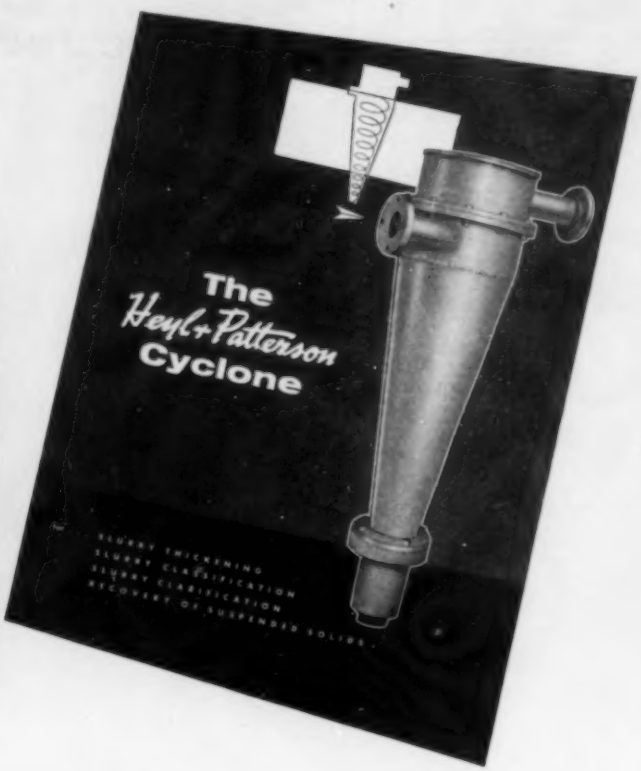
Of Vital Interest to Preparation and Processing Men



This new 20 page Heyl and Patterson Booklet is crammed with information on the H & P Cyclone. It shows how the H & P Cyclones operate, provides flow diagrams and photographs from actual installations, and gives operating data from typical applications in the coal, mining and chemical processing industries.

Interested in closing your Circulating Water Circuit? We can show you numerous instances where plants are operating with closed water circuits today after following the suggestions of Heyl & Patterson engineers. You can read about such plants in the new H & P booklet.

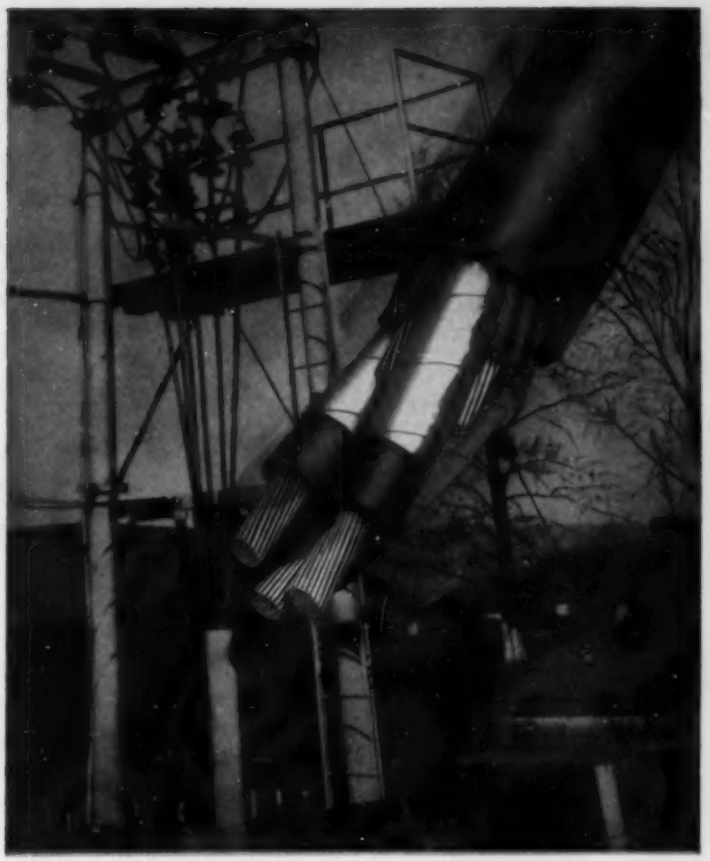
There are probably places in your plant where H & P Cyclones could be used to advantage to replace or supplement other more costly equipment. The obvious benefits of high efficiency, low cost and small amount of space used may open fields of application in which the Cyclone has never been tested.

The very nature of the H & P Cyclone makes it something that every processing man should know about. You will find this booklet worthy of your deep study. It belongs in your permanent file for future reference. Write today for Booklet CT-954.

Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reinveld Centrifugal Dryer
Thorsten Coal Sampling Systems
Rotary Mine Car Dumpers
Coal Crushers
Coal Preparation Plants
Bradford Breakers

Heyl+Patterson, Inc.
"SINCE 1887"
55 FORT PITT BLVD. PITTSBURGH 22, PA.

HAZARD mine power feeder cable:



versatility for mine feeder installations

Hazard Mine Power Feeder Cable is a non-metallic armored, shielded, high-voltage cable that provides the solution for virtually every mine power distribution problem. It can be suspended vertically in borehole or shaft, run horizontally in underground entries or suspended from messenger and supporting insulators. Design of the cable permits direct burial in trenches or installation on the mine floor, since it is highly resistant to the action of mine water and abrasion. In addition, the cable, classified as semi-portable, is easy to move and handle at all times.

Hazard Mine Power Feeder Cable conductors are covered with Semicon tape to prevent internal corona cutting. The Keystone high-voltage insulation is resistant to heat, moisture and ozone, giving maximum service life under all conditions. Cable tape on each insulated conductor is colored for permanent identification. Copper shielding tape provides ground fault protection over each conductor, and bare ground wires in contact with the shielding assure low-resistance ground in the event of shielding failure or ground fault in the equipment.

Hazaprene ZBF fillers in the interstices prevent wicking-in of moisture and make possible a tight-fitting, compact construction that will resist abuse and improve flame resistance. A Hazaprene ZBF sheath overall protects the cable against abrasion, moisture and other dangers of mine service.

Complete information on Hazard Mining Cables is available from your Hazard representative or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

2191

HAZARD *insulated cables*

Yoloy reduces body weight, increases payload

THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

Above: Trucks with Perfection Special Contractors' Type Body —all fabricated from Yoloy Steel.

YOLOY IS AVAILABLE in sheets, plates, strip, pipe, mechanical tubing, bars, shapes and cold finished bars.

Here's another fabricator who finds it profitable to use Youngstown's low-alloy high-strength steel. The Perfection Steel Body Co., Galion, Ohio, summarizes its experience with Yoloy Steel as follows:

"The physical properties of Yoloy are such that lighter gauges used in the construction of dump bodies result in considerable weight reduction and thereby provide increased payloads. Yoloy's corrosion resisting qualities provide the additional advantage of lending longer life to the equipment".

Youngstown

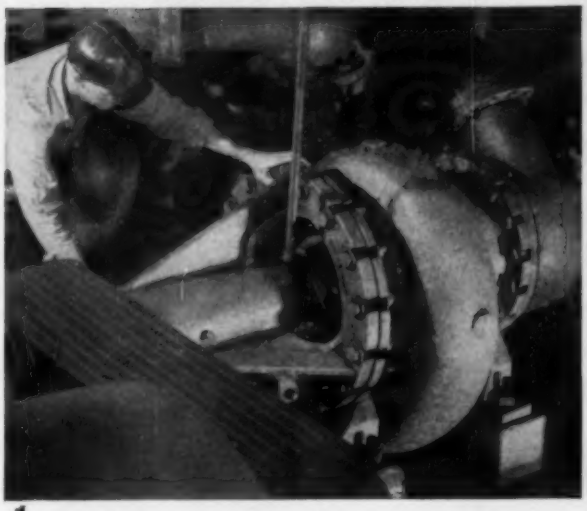
QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Here's what we mean by LOW COST MAINTENANCE



1. Troubles are few and far between

One user of Allis-Chalmers coal washing pump says, "We've been operating them for 8 months without loss of capacity." . . . a third said, "We ran it for 13 months before we replaced the first part." These comments are typical. You, too, can get this long-lived performance with A-C pumps.

2. Inspection is an easy routine

Takedown and re-assembly require less than half an hour. Merely disconnect the drive . . . loosen the nuts on casing bolts . . . and lift out the bolt assemblies. Then, swing out the rotating element. There's no need to disturb the suction or discharge piping. Maintenance men really go for A-C pumps because inspection is so simple.

3. Parts replacement is fast, economical

Wear is limited because there are only 5 wearing parts. This, plus the fact that most parts are interchangeable with those of other A-C pumps, means you won't have to carry big spare parts stocks. What's more, because parts replacement *is* infrequent . . . because it's so fast and simple when necessary . . . you can hold downtime, production interruptions to a minimum.

ALLIS-CHALMERS Coal Washing PUMPS

IN addition to sound design, Allis-Chalmers coal washing pumps feature special hard alloy *Ni-Hard* and extra thickness of metal in critical spots. Then, too, each A-C pump is application engineered to meet the specific conditions under which it will be used.

Remember, Allis-Chalmers can furnish the complete pumping unit — pump, motor, control and drive. Next time you need a coal washing pump, call your A-C representative or write — Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 52B6381. A-4397

ALLIS-CHALMERS

Immediate local delivery of

AUTHORIZED CARBOLOY MINING TOOLS DISTRIBUTORS

Fast local delivery saves you time and money!

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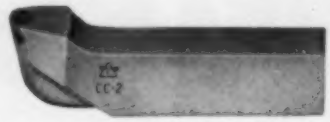
	Charleston Rish Equipment Co.
	Clarksburg Rish Equipment Co.
	Fairmont Fairmont Supply Co.
	Montgomery Marathon Coal Bit Co.

CC-1
Medium-Duty Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-1	½"	1"	4"



CC-2
Heavy-Duty Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-2	½"	1"	4"

CCS-2
Heavy-Duty Bit with Stop

SPECIFICATIONS				
Order No.	Width	Height	Length	Stop
CCS-2	½"	1"	4"	1¾"

CC-3 Extra Heavy-Duty Bit

SPECIFICATIONS				
Order No.	Width	Height	Length	Stop
CC-3	½"	1"	3⅛"	1⅜"

CC-4 Ripper Head Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-4	⅜"	1½"	5½"

Finger Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
FB-8-3	⅛"	⅛"	2⅛"
FB-8-5	⅛"	⅛"	3"

CARBOLOY Department of General Electric Company
11120 E. 8 Mile Ave., Detroit 32, Michigan

Please send my free copy of:

- ☐ New Carboloy Mining Tool Catalog CM-120
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New Carboloy Mining Tool Catalog contains complete information, specifications and prices on new, complete line of Carboloy tools. New Maintenance Manual shows you latest maintenance techniques on all carbide mining tools. Send coupon, today, for your free copies.

full Carboloy® mining tool line cuts inventories and per ton costs

One source—your local Authorized Carboloy Mining Tool Distributor—can handle all your requirements immediately, right from stock

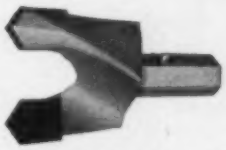
YOUR local Authorized Carboloy Mining Tool Distributor has the correct tool immediately available to answer your every mining tool need. *"Quick off-the-shelf" delivery means you don't have to carry a costly tool inventory.*

Carboloy carbide mining tools are mine-tested, mine-designed and mine-proved by the oldest American carbide manufacturer; their use substantially reduces costs per ton.

During the last 26 years, the Carboloy organization has put painstaking research, skillful engineering and rigid production standards into the manufacture of carbide tools. This experience results in less tool breakage, longer tool life—under any operating conditions. Check your requirements against the tools listed here. Then, place your order with the nearest Authorized Carboloy Mining Tool Distributor, listed at left.

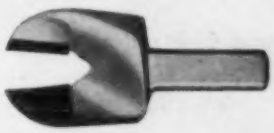
Square-Shank Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
AD-1½	1½"	3"	½"
AD-1⅝	1⅝"	3"	½"
AD-1¾	1¾"	3½"	½"
AD-1⅞	1⅞"	3⅝"	½"
AD-2	2"	3¹¹⁄₁₆"	½"
AD-2¼S	2¼"	3⅞"	½"



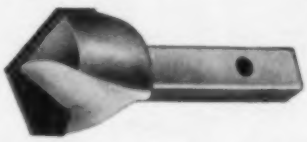
Hex-Shank Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
AD-2½H	2½"	4⅛"	1⅜"
AD-2½	2½"	4⅛"	1⅜"
AD-2¾	2¾"	4¹¹⁄₁₆"	1⅜"
AD-3	3"	5⅛"	1⅜"



V-Prong Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
ADN-1¾	1¾"	3⅜"	½" sq.
ADN-1⅞	1⅞"	3⅜"	½" sq.
ADN-2	2"	3½"	½" sq.

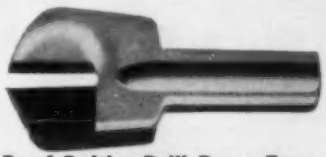


Roof-Bolting Drill, Solid Type

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
PT-1⅜	1⅜"	2¹³⁄₁₆"	½"
PT-1½	1½"	2¹³⁄₁₆"	½"

Roof-Bolting Drill Solid Type with Waterway

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
PTH-1⅜	1⅜"	2¹³⁄₁₆"	½"
PTH-1½	1½"	2¹³⁄₁₆"	½"
PTH-1½	1½"	2¹³⁄₁₆"	½"



Roof-Bolting Drill, Prong Type

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
APT-1⅜	1⅜"	2¹⁵⁄₁₆"	½" sq.
APT-1½	1½"	2¹⁵⁄₁₆"	½" sq.
APT-1¾	1¾"	3¼"	½" sq.

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

ACME STOPER

JUMBOLTER

installs roof bolts three times faster

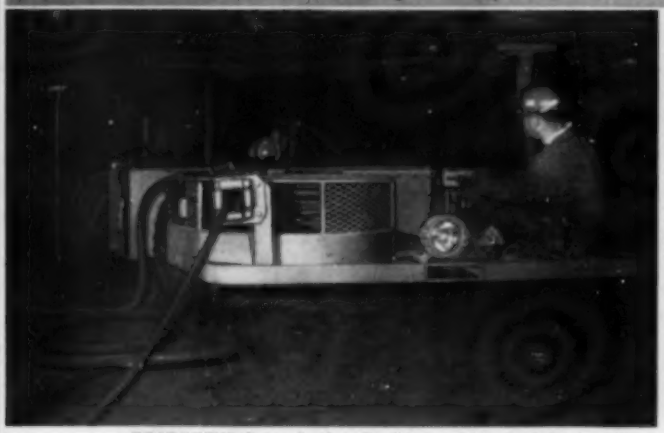
Acme's Stoper Jumbolter is the mine operator's biggest time and money saver since the first stoper. Typical performance: With Jumbolter, two men can complete in 15 minutes a job that used to take three men with hand stopers 45 minutes. Another mine operator reports 210 42" roof bolts installed in one 6½ hour shift with Jumbolter!

With the stretch of an octopus, Jumbolter's air-articulated arms reach out 9 feet, swing in 270° arc . . . bolt an area 23' 10" wide without moving machine.

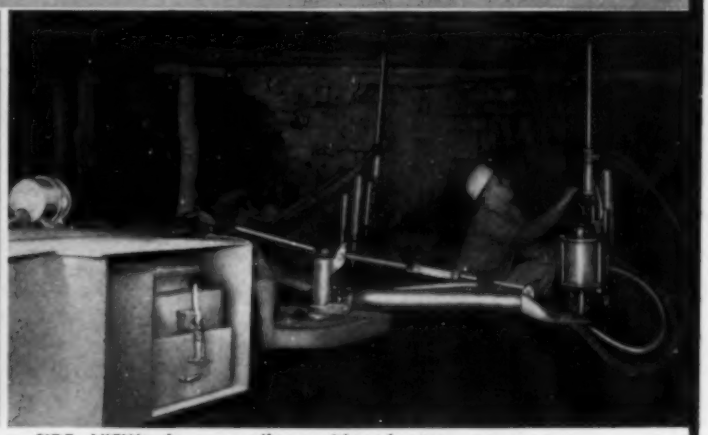
Jumbolter's performance figures show how roofbolting can be the fastest part of the mining cycle, how tonnage is increased and cost-per-ton lowered.

Revolutionary new dust collectors

Jumbolters are equipped with LeRoi-Cleveland stopers which feature new tube-type, suction dust collectors approved by the Bureau of Mines. They save time . . . are easy to service. No jacks or arms to set up — no separate units required.



REAR VIEW shows hydraulic-driven cable reel, hydraulic tramming and steering controls. Operator has ample deck room (42" x 42").



SIDE VIEW shows easily positioned stoper arms. Storage space is provided for 150-200 bolts, nuts and plates.

Write or call today for details on how Jumbolter can triple your roofbolting production.

BUREAU OF MINES APPROVED!

Jumbolter has Bureau of Mines Approval Number 2-1002. Overall height of 30" permits bolting of 36" ceilings. Telescoping stopers can bolt 9 foot ceilings. Adapt the LeRoi-Cleveland stopers you now use to the new dust collecting system with a conversion kit. Jumbolter is 178" long, 88½" wide . . . ground clearance is adjustable from 6 to 9".

ACME Machinery Company

WILLIAMSON, WEST VIRGINIA • PHONE 2274

NOW AVAILABLE

BOWDIL CUTTER CHAIN WITH BIT OPENING ½" x 1"

. . . every construction feature that has made Bowdil Chain the standard of the industry

This model Bowdil Chain has been made available in response to many requests from operators desiring the performance features of Bowdil Chains but whose existing equipment represents a sizeable investment (such as in sharpening equipment), where a changeover to complete Bowdil Bits is felt uneconomical at present, or where changing and varying conditions do not make such changeover practical. This ½" x 1" Bit Chain operates in all Bowdil Cutter Bars as well as all makes of other bars. Takes all types of ½" x 1" bits.

SALES ENGINEERS IN — Whitesburg, Kentucky — West Frankfort, Illinois Charleroi, Pennsylvania — Denver, Colorado — Big Stone Gap, Virginia Danville, West Virginia — Canton, Ohio — Birmingham, Alabama Helper, Utah — Kansas City, Missouri — Centerville, Iowa — Topeka, Kansas New Castle, England — Alberta, Canada

The BOWDIL Company
CANTON 7, OHIO

INTERIOR of the Hydrotator tank at Carpentertown Coal and Coke Company's No. 1 mine, showing the Stainless Steel lining and Stainless rotating parts. The Hydrotator is manufactured by Wilmot Engineering Company, Hazelton, Pa.

saves periodic maintenance bill of $515... eliminates loss of thousands of tons of coal

• Over the last six years, Carpentertown Coal and Coke Company has been shifting to the use of Stainless Steel throughout the entire cleaning plant at its No. 1 mine near Mt. Pleasant, Pa.

One of the most significant savings from this shift involves the Hydrotator tank which has been lined with 3/16" Stainless Steel. Formerly, it was not only necessary to replace the lining frequently, but about every 18 months the entire tank had to be replaced. This involved $200 in labor and $315 in materials, to say nothing of the loss of 100 tons of coal per hour during the three or four days necessary to make repairs.

The Stainless lining has been in service nearly a year and shows no sign of erosion. The tank itself should last indefinitely. Harry Mathias, mine superintendent, says, "We are seriously considering making the entire tank of Stainless Steel in the future . . . then we wouldn't have anything to worry about."

In addition to the lining, all rotating members of the unit are Stainless Steel. "The agitator pipe," says Mr. Mathias, "is made completely of Stainless and should last at least a year, compared to 60 days' service we were getting from common steel."

You'll find many spots in your plant where Stainless Steel can give longer equipment life, reducing maintenance and replacement bills and eliminating downtime with its accompanying loss of production. When you use it, be sure it is perfected, service-tested USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

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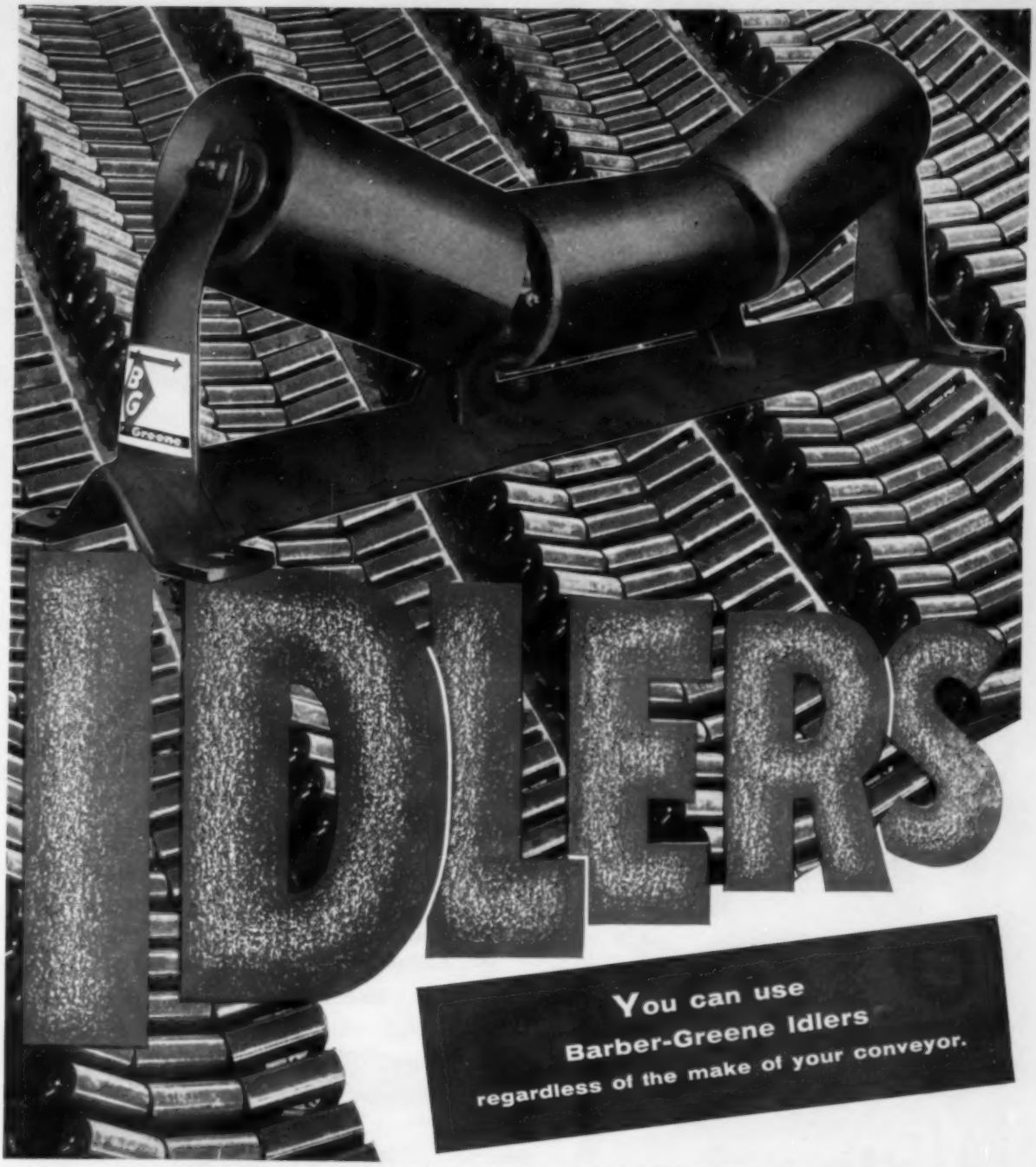
UNITED STATES STEEL



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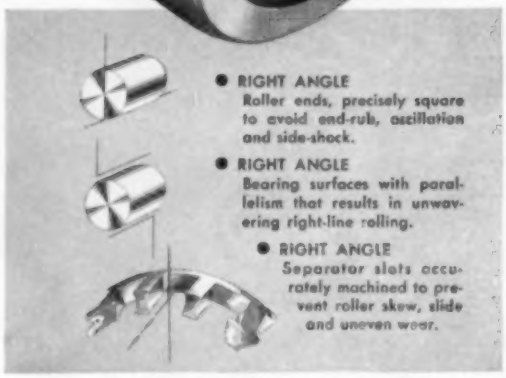
RIGHT ANGLE DESIGN

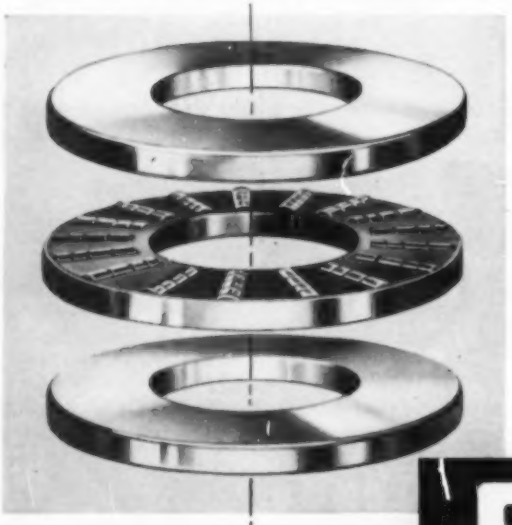
Reduces Maintenance Costs and Shut-Downs

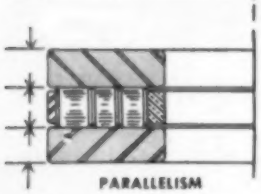
In a Rollway Radial Bearing there's no wedging of the rollers . . . no pinch out . . . far less roller end rub and wear back. Rollway's *Right Angle Design* reduces rubbing friction to a minimum — results in less service attention, longer life expectancy under heavy duty service.

In Thrust Bearing applications, accurate parallelism between the rollers and the matched thrust plates is repeated in the parallelism between the separator slots and the rollers themselves — all adding up to quietness, equalized wear and longer life.



- RIGHT ANGLE
  Roller ends, precisely square to avoid end-rub, oscillation and side-shock.
- RIGHT ANGLE
  Bearing surfaces with parallelism that results in unwavering right-line rolling.
- RIGHT ANGLE
  Separator slots accurately machined to prevent roller skew, slide and uneven wear.





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Rollway Bearing replacements are available through authorized bearing distributors in principal cities. Consult your classified 'phone directory.

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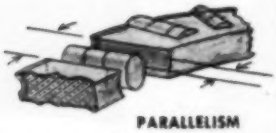

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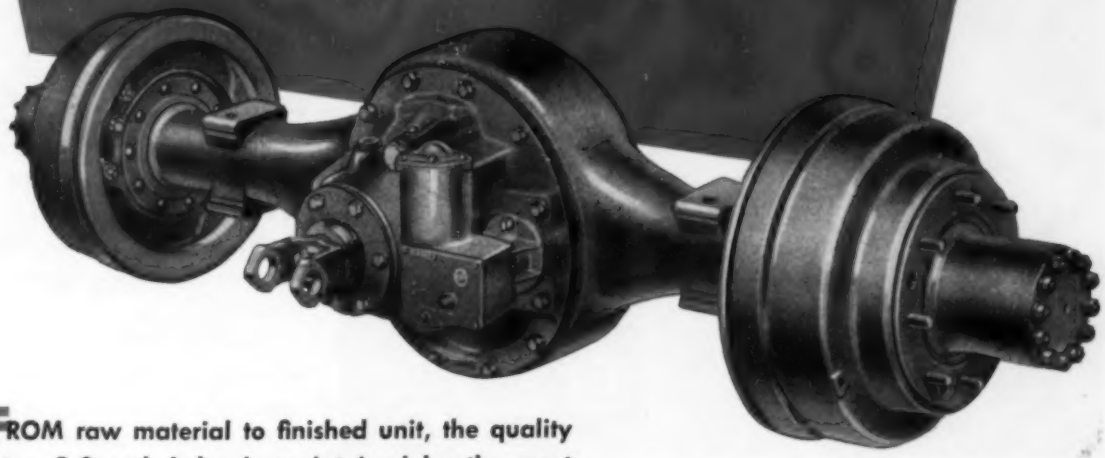
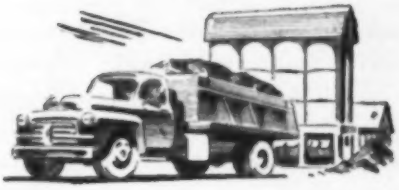
Superior Quality and Exclusive Features shrink hauling costs



FROM raw material to finished unit, the quality of Eaton 2-Speed Axles is maintained by the most advanced control procedures. Strict adherence to exacting quality standards, plus Eaton's planetary gear design, exclusive forced-flow lubricating system, positive shift control, and extra rugged construction combine to keep Eaton 2-Speed Axles on the job, out of the repair shop. They mean extra thousands of trouble-free miles—greatest possible vehicle utility at lowest possible cost.



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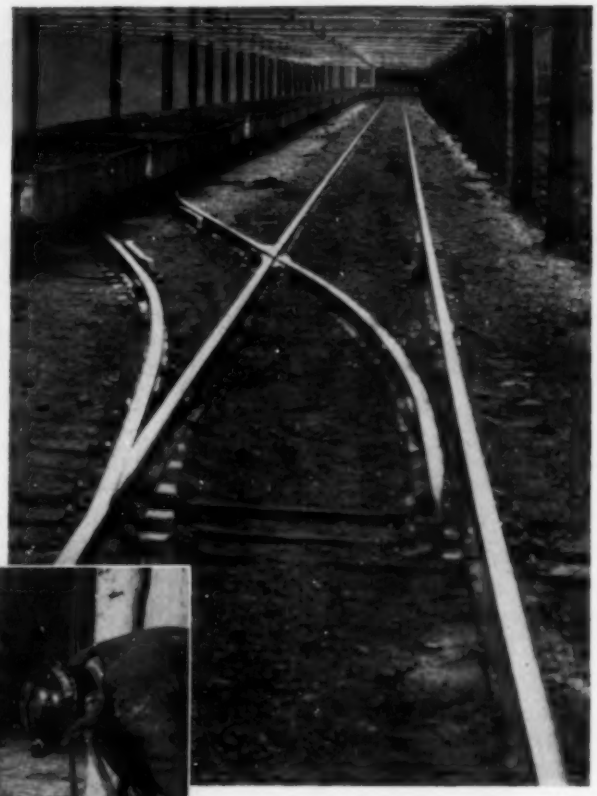
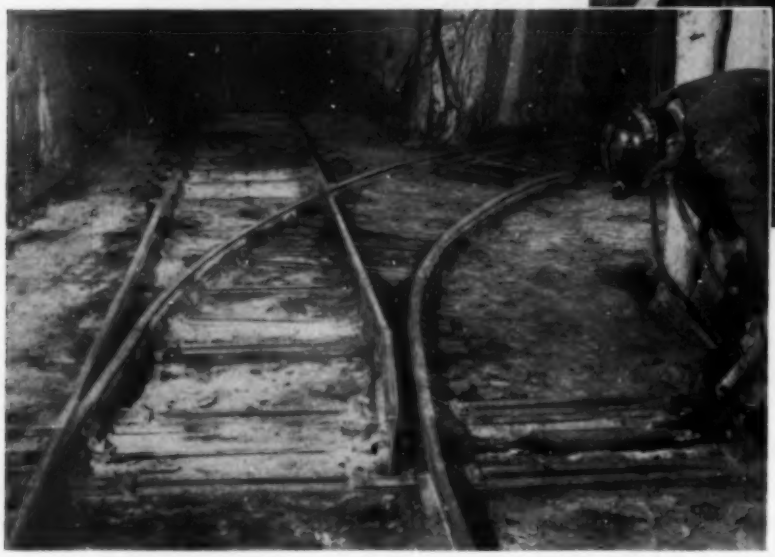
Above ground or below...

BETHLEHEM HEAVY TRACK FOR LOWER MINING COSTS





More and more mines are realizing the economies of heavier, larger-capacity rolling stock. They're also finding that haulage systems must keep pace with equipment modernization. Outmoded trackwork must give way to heavier track that will support the bigger loads, track that will stay smooth and true for many years to come.

That's where a modern Bethlehem prefabricated layout can help. Bethlehem offers track layouts using rail heavier than 60 lb to American Mining Congress standards. These new designs include switches, frogs, closure rails, guard rails . . . even the tie-plates and frog-plates on which the track is laid.

It goes without saying that every Bethlehem track system includes the planning help of a Bethlehem engineer who is well equipped to look over your workings, appraise your layout problems, and design a complete layout to meet your requirements.

To assure utmost efficiency, your new Bethlehem trackwork will be completely prefabricated. All rails and other track components will be carefully pre-assembled at our plant to assure exact fit when installed at your mine. Every last bolt and splice bar will be included so that installation will proceed like clockwork.

Sound expensive? You have a pleasant surprise in store! Many mines have found that a Bethlehem layout actually costs less in the long run than a system they might have built themselves. Such a layout could well be the economical backbone of the rehabilitation program you have in mind. Talk it over with a Bethlehem engineer; he's available through the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

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BETHLEHEM STEEL

BETHLEHEM PREFABRICATED TRACK

Stays out of the shop, stays on the job!

LE ROI TRANSO
Unitized design simplifies maintenance
4-wheel drive traction reduces engine strain and tire wear
Torque converter provides smooth flow of power... cushions shock

Le Roi-Transo TLF-150 Front-End Loader

YOUR first look at a Le Roi-Transo TLF-150 tells you it's got guts — guts aplenty! And Le Roi-Transo engineering is the reason.

Because of Le Roi-Transo engineering, your TLF-150 is seldom tied up in the shop. Because of Le Roi-Transo engineering, you load faster, travel faster, and dump faster — in sand, mud, snow, or rocky terrain.

Le Roi-Transo design assures you of less downtime these and other ways:

- Engine, transmission, clutches, axle assembly, and torque converter are grouped compactly and are easy to get at. You save maintenance, time and labor. For example, it takes *less than an hour* to replace the spring-loaded clutch.
- Patented "bucket-rocking action" helps you get a full bucket load within seconds, without tire-spin or undue strain on the loader.
- Torque converter assures smooth flow of power to all four wheels — gives you sure-footed traction, reduces engine strain and tire wear.

It's design details like these that help Le Roi-Transo TLF-150 save important time and money for you.

Have your Le Roi-Transo distributor arrange a demonstration, so you can see *all* the reasons why it pays to use a Le Roi-Transo TLF-150 on your material-handling jobs. YD-15

Note how compact arrangement of transmission, clutches, and torque converter puts transfer case conveniently at rear, so by merely removing the rear grill you can replace transmission clutch in less than 60 min.
TRANSO
LE ROI

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.
TRANSO DIVISION
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Field Replacement

OF FUEL, AIR, WATER AND OIL LINES

Quick and Easy

WITH

NEW AEROQUIP

SOCKETLESS

FITTINGS AND HOSE KITS

● Hose lines are the life lines of construction equipment. The breaking of a single fuel, air, water, or oil line while equipment is on the job results in expensive downtime until the damaged hose line can be replaced.

● This compact, new Aeroquip kit can be carried right on your field service truck. It contains a complete assortment of *SOCKETLESS* fittings and reels of Aeroquip 1525 hose that can be cut to required length.

● Hose line assembly is amazingly easy . . . and QUICK! No tools of any kind are needed because 1525 hose can be *pushed* on the *SOCKETLESS* fittings by hand. In spite of the ease of assembly the fittings STAY on.

● By making fuel, air, water, and oil lines right in the field you save time and money. Solve your hose line replacement problems with this Aeroquip *SOCKETLESS* kit. See your distributor or write us for information.

Aeroquip

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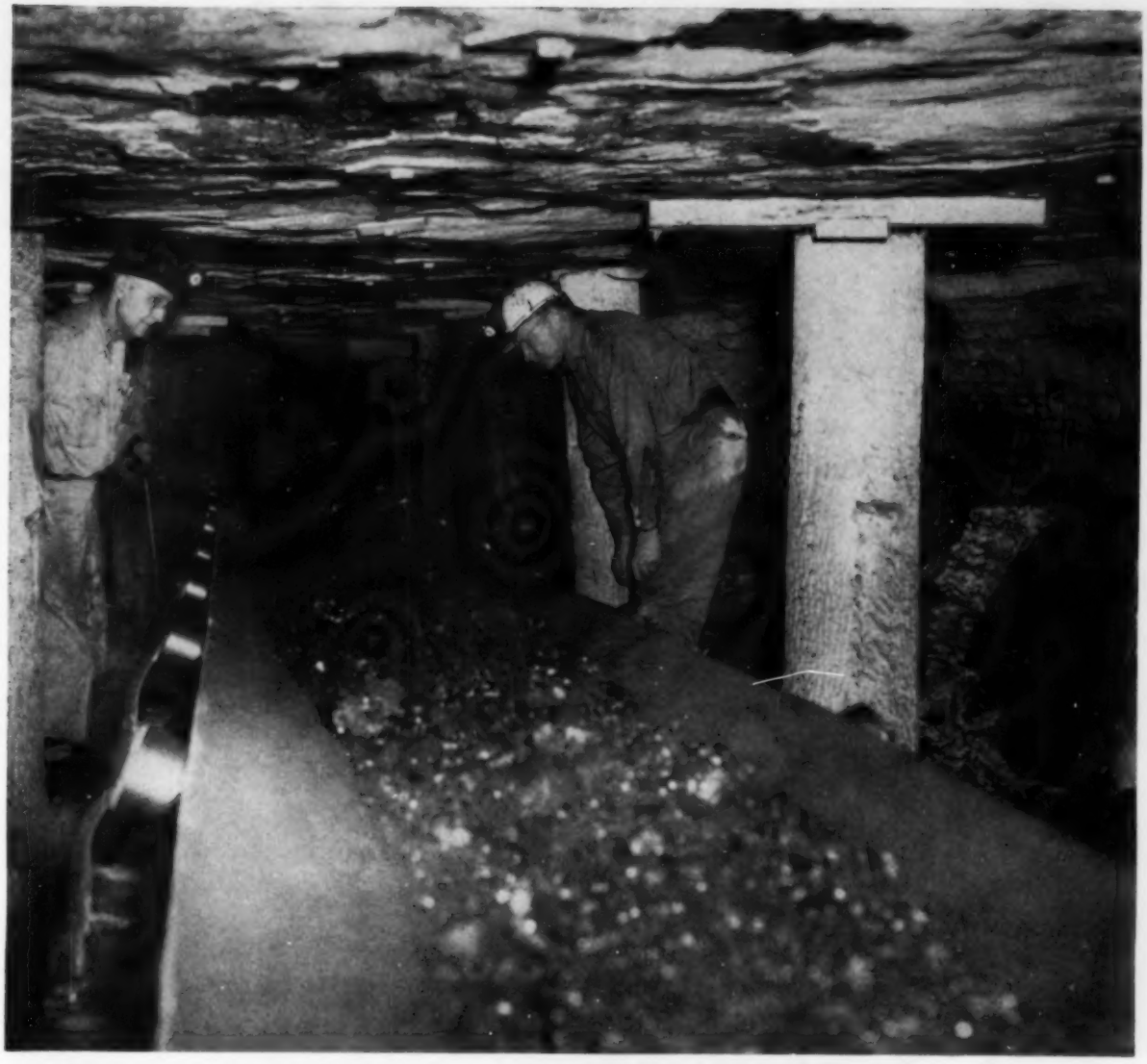

NEOPRENE FEEDER BELT AT TRUAX-TRAER COAL CO., United No. 1 Mine, Kayford, W. Va., carries 350 tons per shift between the working face and mother conveyor. Company management have come to expect long life from neoprene conveyor belting because neoprene has the rugged endurance needed to take the punishing impact and grinding action of the coal. And, in addition, neoprene is flame-resistant. It won't support combustion . . . provides greater safety in the mine. The result is long service life, big savings on replacement, and extra dividends in safety. Next time you order conveyor belting, specify neoprene—the same tough material used to jacket mine trailing cable. Neoprene offers you outstanding ***resistance to abrasion, fire, aging, oil and grease.*** Keep abreast of the latest neoprene developments . . . mail the coupon below today!

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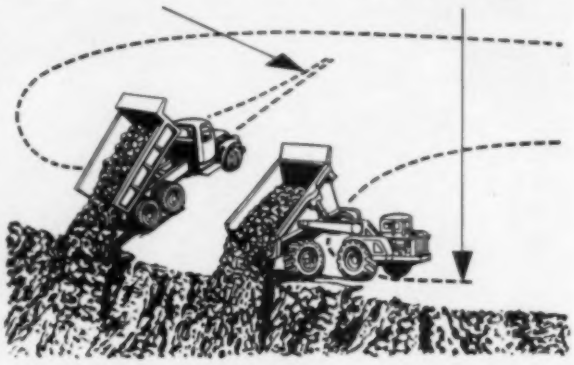
30 FEET OF TRAVEL... ...SECONDS OF TURNING SAVED...

You can eliminate 30 feet of travel and 30 seconds of maneuvering with an Athey PR21 Rear-Dump Trailer. Rear-dump trucks have approximately 45° turning ability . . . it takes twice as much space *and* time to swing onto the fill, back and dump! With the PR21 you make turns of 90° under hydraulic-control. The rig can turn in less than its own length, without stopping! It can maneuver, turn and dump its 22.5 cu. yd. load on a 36-foot wide fill. The trailer can be dumped with the tractor at any angle. The 30 feet and 30 seconds that a PR21 saves can mean added production and profit!

Change your fill traffic pattern to a short, safe, profitable Athey PR21 pattern—your Athey-Caterpillar Dealer can show you how!

ATHEY PRODUCTS CORPORATION
5631 West 65th Street Chicago 38, Illinois

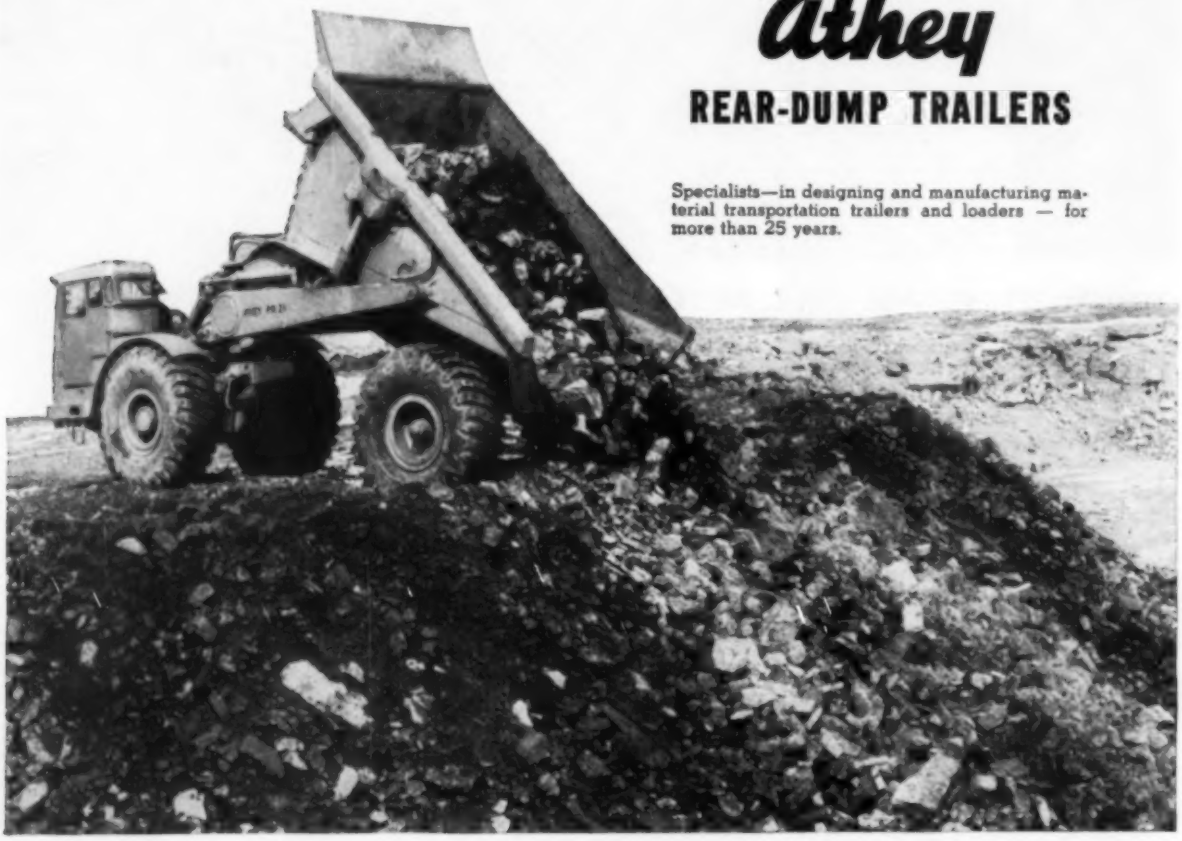
NOT THIS . . . BUT THIS



By turning 90° to back to the edge of the fill, the Athey PR21 saves 30 feet of travel, 30 seconds of time. Write to Athey for the new catalog that shows how the PR21 saves you money—loading, hauling, dumping. *It's free!*

Athey
REAR-DUMP TRAILERS

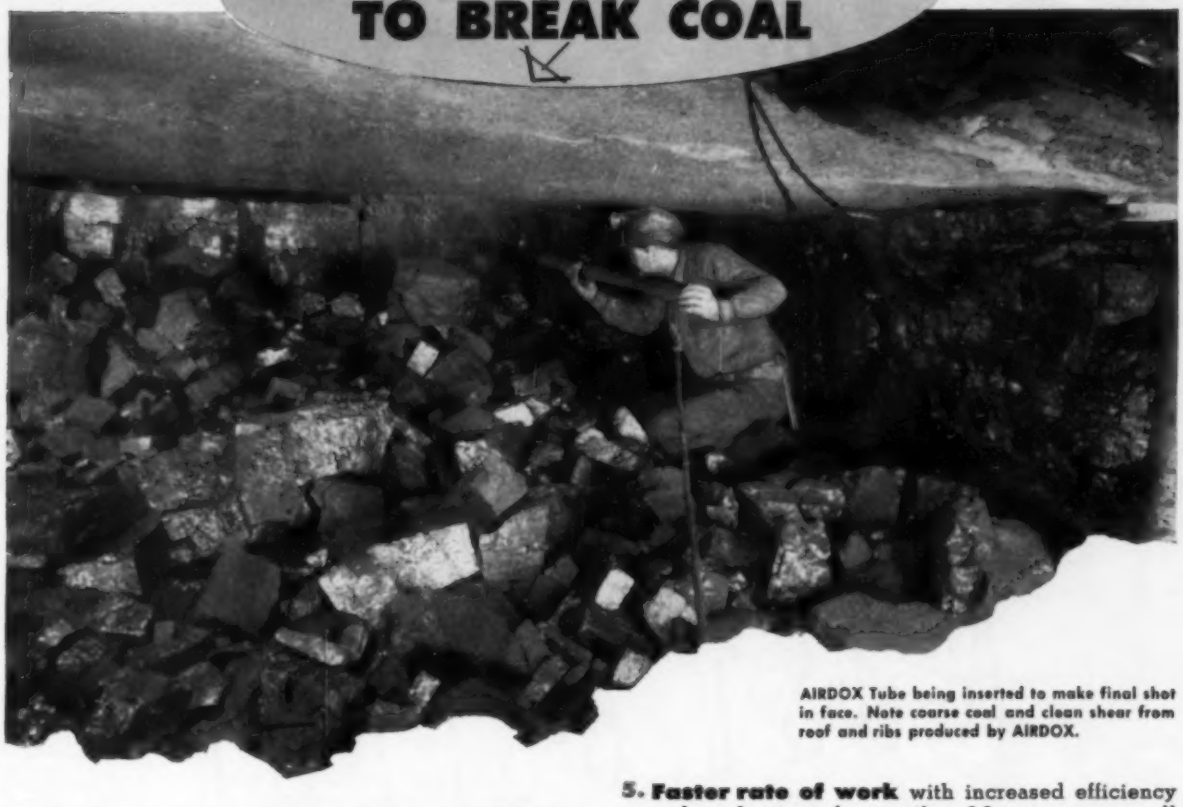
Specialists—in designing and manufacturing material transportation trailers and loaders — for more than 25 years.



Another Mine Proves AIRDOX

NON-EXPLOSIVE MINING METHOD

is the SAFEST, CHEAPEST WAY TO BREAK COAL



AIRDOX Tube being inserted to make final shot in face. Note coarse coal and clean shear from roof and ribs produced by AIRDOX.

In this mine located in the Pittsburgh Seam, AIRDOX Non-Explosive Mining teamed up with modern equipment and methods, is proving conclusively its ability to produce quality coal at lowest possible cost.

In emphasizing the savings and advantages of AIRDOX, the operators of this mine cite the following benefits:

1. **Excellent loadability** insures high production with less maintenance on loading machines.
2. **Minimum shattering** of roof strata with a roof far superior to that of previous years.
3. **Firm, square faces and ribs,** with less sluffing of coal.
4. **No smoke and fumes** and no delay in face cycle waiting for smoke to clear away.
5. **Faster rate of work** with increased efficiency and production of more than 10 tons per payroll employee.
6. **Less fines,** plus increase in overall size in the product, increases cleaning plant capacity and improves realization because plant losses are cut down.
7. **Greater safety** than with any other method of breaking coal.

This is just one of scores of mines in which AIRDOX has shown itself to be the most economical and safest way of breaking coal.

If you are not now using AIRDOX Non-Explosive Mining, why not find out how much it can improve your operation and cut your costs? Write and we'll arrange a free survey, at no obligation to you.

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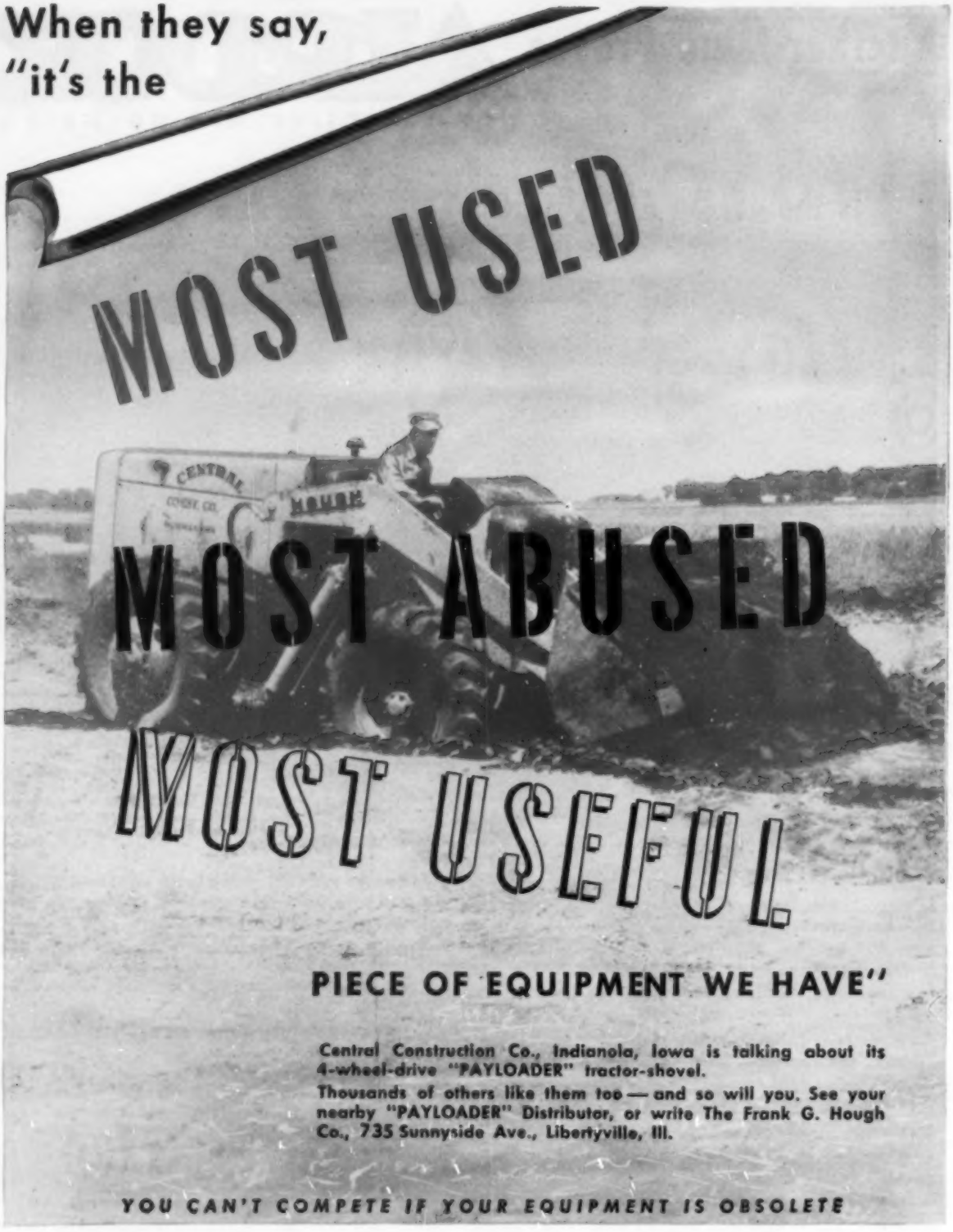
When they say,
"it's the



PIECE OF EQUIPMENT WE HAVE"

Central Construction Co., Indianola, Iowa is talking about its 4-wheel-drive "PAYLOADER" tractor-shovel.

Thousands of others like them too — and so will you. See your nearby "PAYLOADER" Distributor, or write The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Ill.

YOU CAN'T COMPETE IF YOUR EQUIPMENT IS OBSOLETE

PAYLOADER®
THE FRANK G. HOUGH CO. · LIBERTYVILLE, ILL.
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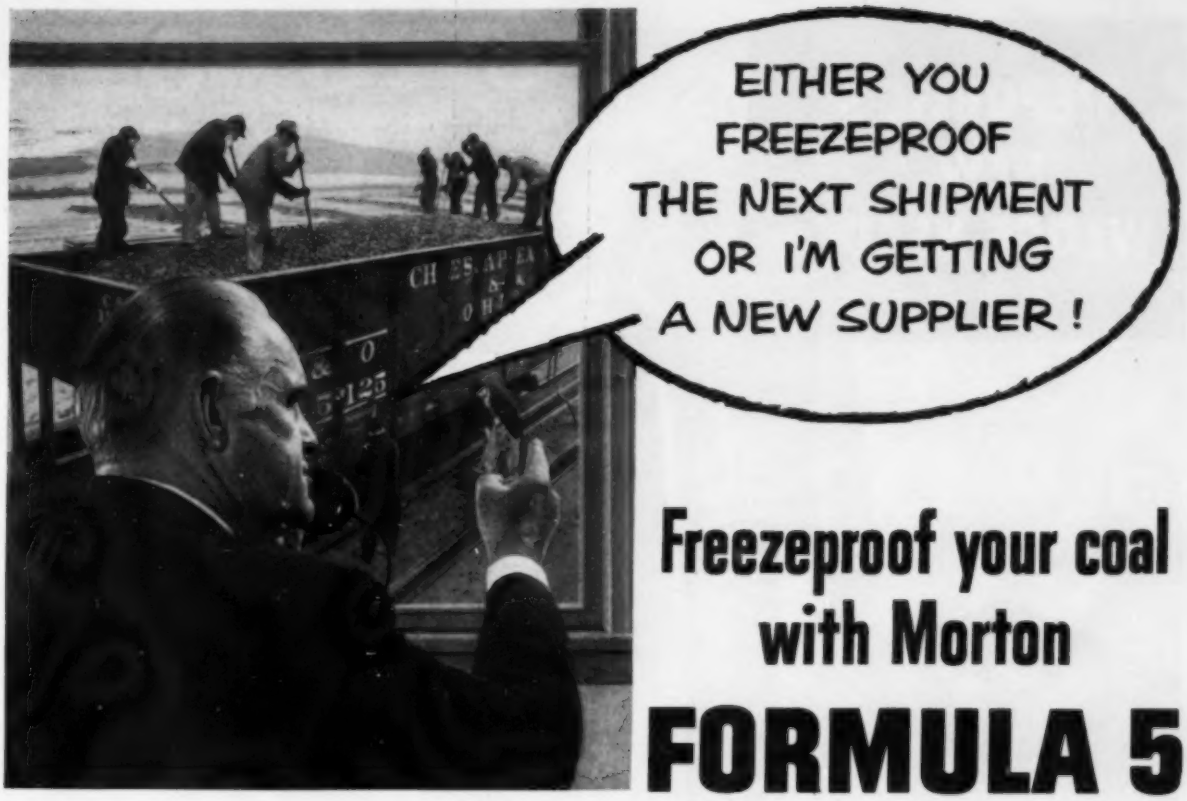

Freezeproof your coal with Morton FORMULA 5

Don't let your customers get burned up over frozen coal! Eliminate costly unloading delays by shipping them coal freezeproofed with Morton "Formula 5." It saves them time, labor, and money.

Morton "Formula 5" is an inexpensive, free-pouring, dry product composed of sodium chloride (30-70 mesh) and a special anticorrosive compound.

"Formula 5" is effective at subzero temperatures. Needs no mixing, no extra handling. Apply dry direct to coal.

You get all these extra benefits with the only freeze-proofing product made exclusively for the coal industry—Formula 5 • Scientifically treated to produce an ideal dissolving rate and minimize loss during initial draining • Will not lump in feeder • Contains a rust inhibitor to protect your equipment • Harmless to coal, harmless to hands and clothing of workers • Can be used for conveyor equipment, switches, tracks, etc. • Readily available—comes in tough, 100-lb. bags.

INFORMATIVE FREE BOOKLET

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Department CB-10

Please send me your free booklet on "Formula 5"

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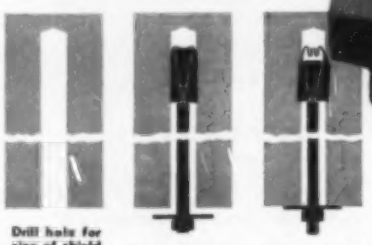
REPUBLIC'S *NEW* WEDGE HEAD

Cup Plate

Standard Plate

HOW TO INSTALL



Drill hole for size of shield used.

Insert bolt to proper depth. Add bearing plate and nut.

Wedge on end of bolt forces shield to grip side of hole as nut is tightened.

provides safe, sure mine roof bolting

Republic's Wedge Head Mine Roof Bolt was thoroughly tested for over a year in both coal and ore mines. It is a safer and stronger method of roof bolting.

The deep, sharp serrations of the shield provide positive holding power. Steep angle of the wedge assures a positive anchor. Spot welded mild steel clips hold shield securely for positioning. Shields are hot forged to resist collapse. Shields are available for 1⅜″ and 1½″ holes. Both sizes fit ¾″ bolt.

Republic's New Wedge Head Bolt features a full four inches of rolled thread. When desirable, exposed threads may be left below the bearing plate providing a fastening point for other equipment. The danger of twisting bolt in two and torsional stresses is eliminated because the bolt is not twisted in tightening operation.

The bolt is available in two types of steel—1020 low carbon steel for standard use and high carbon steel for extra strength. It is also available in any specified length in ¾″ diameter size.

The Republic Wedge Head Mine Roof Bolt is suitable for installation in either stoper-driven or auger-drilled holes. The hole length need not be exact. Bolts can be reset to greater depth by drilling hole deeper than bolt length at time of original installation.

For additional information, write:

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
1970 Carter Road • Cleveland 13, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC BOLTS AND NUTS

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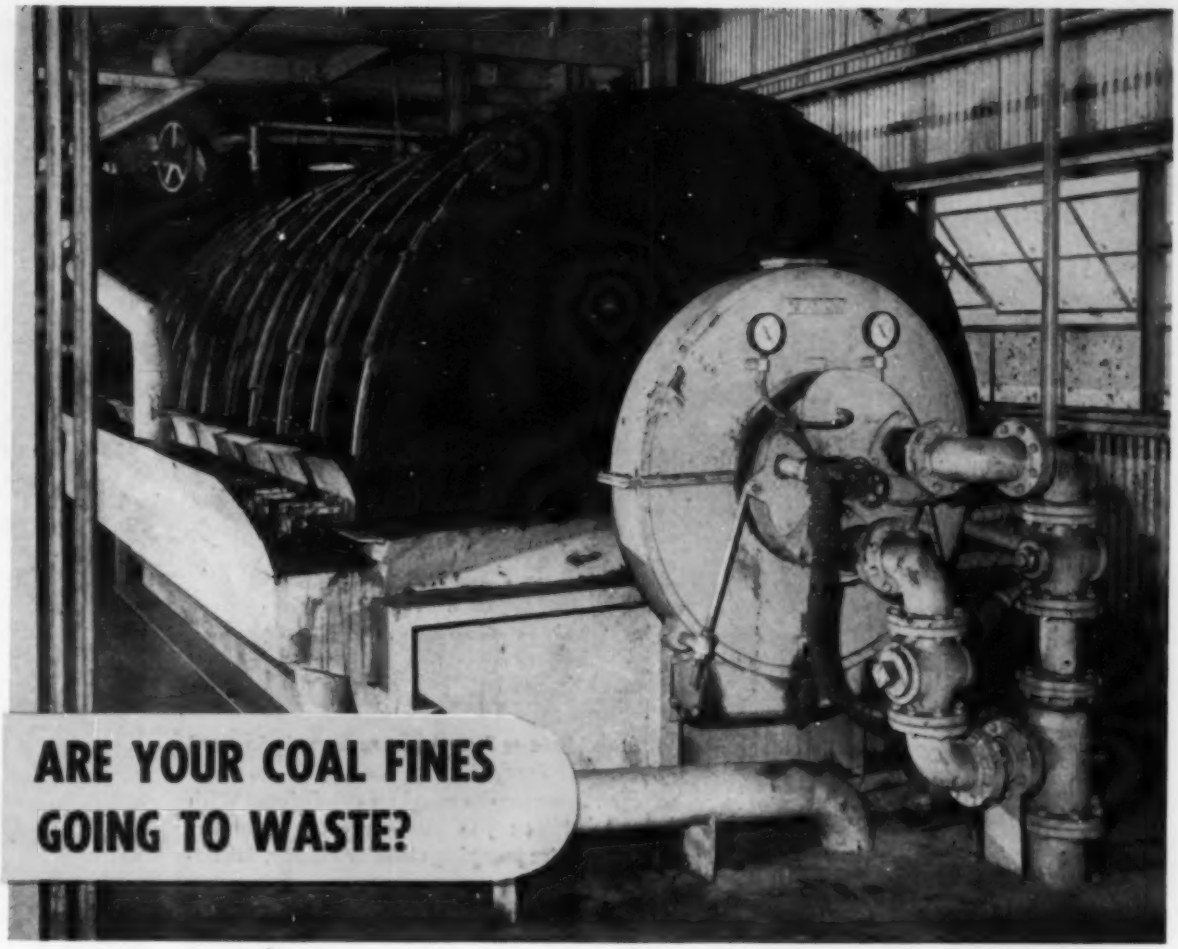
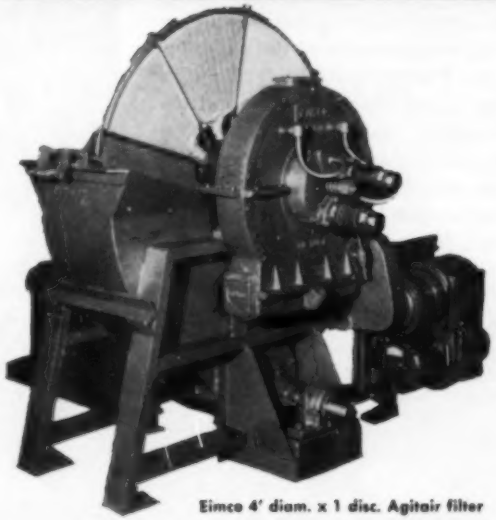


ARE YOUR COAL FINES GOING TO WASTE?



Eimco 4' diam. x 1 disc. Agitair filter

Coal fines are an economical source of revenue, they can be reclaimed and will pay in a short time, for all equipment necessary to make the installation.

Several flow sheets employ Eimco filters as the dewatering equipment in plants set up to reclaim the fine coals. Eimco filters are best because they do the job for less money.

Eimco filters will dewater greater tonnages per square foot of filter area per hour. They are simple in design and built for long periods of continuous operation with a minimum of attention. They produce a thick, evenly distributed cake formation, uniformly dried to low moisture content. Eimco filters have a clean discharge of the cake which provides much greater bag life and many other advantages.

Write for complete information on fine coal dewatering with Eimco Agidisc filters.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Ida. London, Eng. Paris, France Milan, Italy

You Can't Beat An Eimco!

TOP PUMPING PERFORMANCE

day after day!

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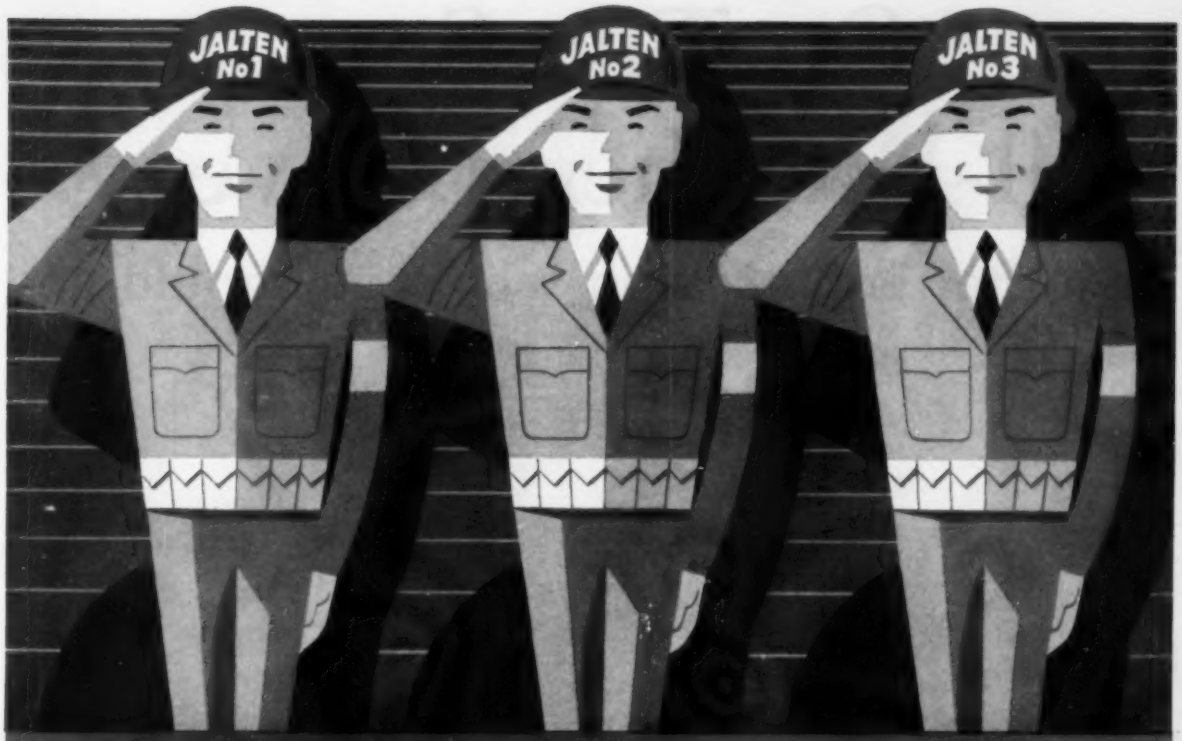

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

OCTOBER, 1954 IVAN A. GIVEN, EDITOR

Policy for Progress

THE COAL PICTURE TODAY is a study in contrasts. To cite one in particular, there is almost universal agreement within and without the industry that demand for its product will grow to really impressive volumes in the not-too-distant future, yet today it is operating in low gear and is experiencing all the troubles that flow out of reduced demand, curtailed running time, and thin or vanishing profit margins. And for another, its present position and future potential as a contributor to employment at high wages, not only in the industry itself but in allied industries, as well as its record in raising efficiency, heightening quality, promoting safety and meeting all demands for fuel in both peace and war entitle it to at least an even break, yet government tends to favor competitors.

Two Jobs Today

The number of contrasts between things as they are and things as they should be could be expanded into an impressive list, with the conclusion that coal has two major jobs on its hands today. One is to bring an end to the present situation at the earliest possible date and thus get back to a reasonable degree of profit and prosperity as soon as possible. The second is to attain a sound basis for cashing in on the progress and profit opportunities that will flow out of rising demand in the future. In large part, the solution to one problem also is the solution to the other.

Vital Ingredient

The fact that coal today is pressing its search for the answers to its problems more intensively than ever, and the equally important fact that it is working toward a unity of effort never before experienced in the industry, are two most heartening signs of the day. Primed with the facts, armed with a plan and operating in line with clearcut policy, the industry can move more readily into a position of strength in coping with problems, improving service and attaining a reasonable profit. Policy is a vital ingredient—and a major goal in today's program of building markets and stature through better service. Understanding—and with understanding a clearer picture of what needs to be done and how to do it—are the big benefits of clearcut policy, which provides a definite target and channels effort directly to that target.

Guide and Stimulus

The statement of aims and objectives that constitutes effective policy is the product of thorough study and the meeting of minds that follows that study and its accompanying discussion. Once hammered out, policy provides not only a rallying point but also a guide and stimulus to effective action on all fronts—cost, quality, merchandising, government relations, market development and all others. These were the tests employed in arriving at the suggestions incorporated in "Coal Policy for Today," presented on the next five pages of this issue as *Coal Age's* contribution to the thinking and action out of which effective policy evolves.

Unity for Power

Whatever its final form, settlement on clearcut policy signals the achievement of a high degree of unity in action—and that unity makes for progress by bringing the massed power of the entire industry to bear on the solution of problems and the development of better ways of doing business. In fact, unity where unity is indicated is a policy point of vital importance in itself, and a second major reason for a real effort in policy development. Coal can progress only to the extent that it is willing to work to achieve its goals, and clearcut policy will make that effort more meaningful and more productive.

Coal Policy for Today

1. **Unity in Action:** Consolidate industry power to develop and act on policies and programs.
2. **Individual Backing:** Reinforce industry solidarity with individual action at the grass roots.
3. **Support From Outside:** Seek allies through ties that bind coal and other interests together.
4. **Support From Inside:** Increase solidarity by winning support of workers and their union.
5. **Competitive Costs:** Exploit cost-cutting potentials in modern machines, materials and methods.
6. **Profitable Prices:** Stand firm for prices that reflect coal's value and return adequate profits.
7. **Markets for More Coal:** Pool selling power and add individual effort to expand coal markets.
8. **Internal Competition:** Seek stability by massing assets, skills and sales resources in larger units.
9. **Mine-to-Market Costs:** Develop new transport methods; consolidate drive for fair freight rates.
10. **Higher Quality:** Create stronger sales approach through ever-better preparation of coal for market.
11. **Wider Research Horizons:** Provide research support adequate to coal's needs and potential.
12. **More Safety for Workers:** Use all existing resources and find new ways to make mining safer.
13. **Equal Opportunity:** Remove barriers to fair competition through education in government circles.
14. **Self-Reliance for Protection:** Look primarily to coal, not to others, for the lasting answers.

A SOUND, progressive and profitable coal industry, able to grow through better service and thus contribute to the growth of the Nation, is vital to the security and progress of the United States. It is assurance that the Nation never will lack low-cost energy and raw materials—the foundations for a constantly rising standard of living and the rocks on which effective defense against possible aggression must be built.

Translated into tonnage and net income, this means that today the bituminous industry should be producing about 550 million tons per year and should be netting at least 50c per ton. Anthracite, likewise, should be producing at least a third more than now and should be enjoying a net profit in conformity with the sales price of its product.

The fact that coal today is having more than the usual difficulties in attaining this sound and progressive condition reflects, among other things, the following:

1. Rising competition from other fuels and energy—in significant part based on competitive advantages not available to coal or the result of government preference and discrimination.

2. Lack of a well-defined program for meeting this competition, securing the elimination of unfairness and inequalities and attaining the profit level necessary for maximum progress through maximum service.

This is not to say that coal has made no progress. The $2 billion spent for improvements and new mines in the past 10 yr or so is only one of the many examples of what coal has done to advance its interests and the interests of the fuel user. Rather, it is to say that coal still has ground to gain on many fronts besides those where major efforts now are concentrated, and that well-defined policy and organization to make that policy effective will speed the process.

What should policy be? How should it be put to work?

These are questions of the day in coal mining, and the hunt for the answers is one of the most intense in the history of the industry. As its contribution to finding these answers, *Coal Age* offers the following suggestions, based on several months' study of the problems and discussions with key men in production, sales and labor in the industry.

1. Unity in Action

Bring 100% industry power to bear through 100% affiliation with local, state and national organizations; through active participtation in developing policies; and through active cooperation in effecting these policies.

Unity in action manifestly cannot be attained in all phases of mining. In many, in fact, it is not necessary or desirable. But, for example, in the problem of attaining realistic tax treatment, there is every reason for the industry . . . wholly and completely . . . from the largest organization to the smallest . . . captive and commercial . . . to act in unity, both through established organizations and as individual employers, workers and citizens, since favorable results mean benefits to all.

On the state level, as another example, the chances of achieving fair consideration for coal in state institutions is greatly improved when those to whom coal's story is told are convinced that the entire industry is behind it. Unity—and the strength that flows out of unity—also attract support from others of a like or sympathetic mind.

2. Individual Backing

Step up industry power by individual action to reinforce organization action.

Presentation of the industry's case for, say, restriction of residual-oil imports takes on added power when it is clear that it represents the thinking of the entire industry. But for maximum power and impact, two jobs must be done: (1) Individual companies and individual men must help in making the strongest possible case; and (2), more important, the organization's case must be backed up by the maximum in individual representations to legislative committee members and specific senators and congressmen. One well thought-out and well documented letter from a constituent frequently means more to a legislator than a committee report half an inch thick. And if all the coal-mining constituents of a congressman or senator do a similar job, the impact is multiplied in proportion.

The opportunities for individual action to back up the industry's program exist in many other directions in addition to representations in congress. An industry advertising or public-relations program might well be paralleled by company programs in their production and marketing areas. Again, merchandising programs designed to build markets for coal in schools, for example, should be reinforced by the efforts of individual companies in areas where their coal is sold. In other words, a search should be made for opportunities in which individual effort can supplement national or industry effort, and action should follow on the discovery of these opportunities.

3. Support From Outside

Campaign actively for support of industry policies and programs by outside individuals and organizations.

Coal should not—and need not—stand alone in any of its campaigns for improvement of the industry. Yet the hard fact is that coal, because it stands alone, sometimes faces added difficulties in getting action where action is needed. Support from the outside can help materially and often may mean the difference between success and defeat.

Outside support, of course, must be merited. Once it is earned, it is necessary to present coal's case and ask for the support on the basis of common interest. For example, if a coal man could get a local service club, which includes in its membership representatives of a wide variety of activities in the community, to support his request for fairness in natural-gas marketing, the congressman or senator to whom coal's case is presented would undoubtedly be more impressed with the merits of the case, and therefore more inclined to act favorably.

A survey of coal's broad situation will of course uncover many other opportunities for bringing outsiders in on the side of the industry. For instance, a persuasive approach might convince coal-carrying railroads that their own interests, as well as coal's, would be well served by adding more combustion engineers to their coal-traffic staffs.

4. Support From Inside

Build industry solidarity by enlisting the support of workers, collectively and individually.

There are, and perhaps always will be, areas where management and workers contest against each other: for example, the question of who gets how much.

But the fact is that both management and labor thrive in a healthy industry and that, for both, there really is more common ground than battle ground. A healthy industry therefore is, or should be, the common aim.

Experience among some companies proves that it is possible to win the cooperative support of workers. These companies have succeeded by fully sharing the facts about their operations and their standing, by always putting the emphasis on common interests of workers and the company, by seeking solutions in the light of fact and reason, and by equipping front-line supervisors with the skills that produce good human relations. This approach still is the best hope of winning the support of individual workers, company by company, throughout the industry.

Industry-wide, understanding of the problems and needs of both sides, management and labor, is the key to unity and joint effort. Understanding in some measure already has placed the union and the industry's agencies side by side in efforts to solve such problems as imported oil, natural-gas encroachments and rising freight rates.

Joint strength can be equally formidable in other common causes, namely: (1) awakening top government officials to the need for a strong coal industry; and (2) protecting the wage agreement from erosion.

To achieve massed power in solving these and other problems, the answer may well lie in closer liaison, with frequent informal talks, free exchange of views and information, and a sustained search for ways to be mutually helpful. The agencies capable of such liaison already exist at district as well as national levels. What is needed, perhaps, is more receptive cordiality on both sides and a broadening of their respective areas of concern.

5. Competitive Costs

Maintain and improve coal's competitive power by taking full advantage of the cost-cutting possibilities of modern equipment, materials and methods.

Competitive prices always have been one of coal's most effective weapons, and all the indications are that coal has an even greater opportunity in this direction in the future. This opportunity arises out of the fact that coal, through equipment, materials and methods available today, can

materially reduce production costs, while every sign suggests that the prices of oil and natural gas have no way to go but up, even though these industries may make temporary cuts for a temporary competitive advantage.

The labor cost in coal, compared to that in competitive fuels, is where coal has this major advantage—and with it, a major opportunity. Oil and gas have no room to cut labor costs. But coal has the opportunity of reducing labor cost per ton from its present level of $2.50 to $3 to as little as $1.50 to $2. For example, a deep mine using equipment available today and producing from a seam averaging only 34 in in thickness is getting a labor cost of $2 or less even now.

New equipment that will be available in the future can be expected to expand these cost-cutting opportunities. By taking full advantage of its possibilities in the future, as well as of the possibilities with today's equipment, coal can get real help in bringing its profit margin up to the proper figure, and at the same time can go into the marketplace with more and more favorable prices.

6. Profitable Prices

Operate on the premise that coal has values that make it worth an adequate price and, with that conviction, make every effort to secure that price.

Whether, to paraphrase Hamlet, it is better to run at prices too low for a proper return, or to suffer the costs and penalties of a reduced rate of operation or a complete shutdown—that is the question. The answer is not easy. At the same time, there is evidence that coal is inclined to give in too easily when a no-bill shows up on the sidetrack. Hard decisions are involved in attempting to firm up prices, but the rewards of an adequate return are undoubtedly worth the headaches involved in obtaining it.

7. Markets for More Coal

Strengthen, broaden and solidify coal's merchandising and selling power to exploit the market potential.

To market a product successfully, four elements are essential:

1. A price that is right.
2. High qaulity.
3. Strong promotion and merchandising.
4. Hard selling.

In the first two elements, a company must hew out its own progress. Though many companies have made substantial progress, the way to further progress for them and others still is wide open, as pointed out elsewhere.

But price and quality alone are not enough. To sell successfully, the industry must know who the actual and potential customers are and where they are; find the means to tell them how coal can serve them; meet them on their own ground, make the specific proposal and close the sale; and provide the delivery, engineering and trouble-shooting services that back up product claims and keep users content.

Massed power therefore is a substantial part of the answer to promotion, merchandising and selling. Granted, much already has been done to strengthen these activities, industry-wide and, in some instances, on a company basis as well.

But if much has been done, much remains to be done.

In the first place, organized mass efforts already under way need to be sustained and strengthened. If they have not yet turned the tide, they still are coal's best hope.

In the second place, few individual companies have yet exploited to full potential the promotional materials and sales helps created by the massed efforts of the industry's agencies. Top company executives must take on the responsibility of making known the availability and usefulness of these sales and promotional aids to their sales people.

In the third place, strength on the sales front reflects strength in the sales organization, whether individual company, independent, or industry-organized regional. Strength reflects, among other things, tonnage at the organization's command, contributing to the power the agency can mass, plus sales skill and effort. Whatever the type, the strong sales organization with a skilled staff and volume sufficient to underwrite a real effort is vital in building markets.

Finally, coal needs to back up the efforts of its sales organizations in all the ways backing up will help. These ways include provision of facts about markets, ideas for promoting coal, time for shaping policies and programs, guidance for agency activities, and skill and willingness to tell coal's story convincingly in specific sales situations. In short, coal needs more men who will help the industry as well as themselves—men who are not content to let somebody else bail them out of their trouble.

Massed power also can be effective in actually closing a sale. This has been proved in the record of regional sales and engineering agencies and in the achievements of fast-moving local-action groups. More such agencies and groups might well forge a stronger sales effort for coal. Meanwhile, the sales-help potential of a large stock-subscription corporation, set up by the industry to design, manufacture and sell coal-burning equipment, should not be overlooked. A start already has been made in bituminous and anthracite.

When it comes to nailing down an actual sale, the field still is wide open to the enterprising company that puts muscle into its sales program. Capitalizing on outside helps and gearing its own activities to them; shaping its own promotion and advertising to fit market-area needs; sending out salesmen who are thoroughly trained in sales methods and product utilization; desiring to serve a customer as well as sell him—these are the ingredients of successful sales for an individual company.

8. Internal Competition

Strengthen the industry and stabilize internal competition by merging assets, management skills and sales resources in fewer but larger corporate units.

Strength in coal today is scattered through a multitude of companies, some small, some big, some marginal and some profitable. The result in today's sluggish market is fierce internal competition for existing coal customers and resultant weakness in coal prices.

While nobody questions the right of a small company to capitalize on its opportunities and thus grow and prosper, or the right of a marginal producer to run his business as he pleases, there is some merit in the suggestion, coming from quarters inside and outside the industry, that coal as a whole would be better off, now and in the future, with fewer and larger producing and marketing units.

Consolidations and mergers are the logical answer. Granted, there are obstacles. Among them are legal and financial questions, especially the question of a fair and acceptable formula for appraising and consolidating assets. Personal ambitions also may be a stumbling-block in some instances. Finally, there is the danger of making a

bigger pile of bones out of two small piles of bones, unless the merging units both are stable companies, with adequate liquid and capital assets, sufficient reserves of coal and a product that is acceptable in the marketplace.

But the potential gains to an industry made up of fewer but larger units are attractive. These gains include:

For the individual companies involved:

1. Larger bulk of net quick assets, working capital and funds for research.

2. Massed selling power and consolidated distribution.

3. More extensive reserves of coal under control of a single company, with a wider variety of coals available for customers.

4. Reduction of overhead costs per unit of production and sales.

5. Shutdown of properties that are not economical in today's market, thus also tailoring production to demand.

6. Ability to speak with a firmer, louder voice in affairs affecting the company, such as freight rates.

For the industry:

1. Such stability in markets and prices as would result from the reduction in the number of units competing for buyers.

2. Greater unity of purpose and action, more strength for wage negotiations, and better leverage for bargaining with government agencies, federal and state.

Full-scale consolidations take time. Meanwhile, a nearer goal might well be consolidation of sales effort through stronger sales agencies, supported by participating companies or operating independently. That would be a step toward solving the industry's most pressing problem today —the orderly marketing of coal at an adequate price.

9. Mine-to-Market Costs

Bring transportation costs down through solidarity in action and creation of new ways to move coal to market.

Today's high rail-freight costs put coal at a competitive disadvantage, since freight cost is a direct charge on the customer.

The answers to the problem of high transportation costs lie in pressing coal's case vigorously in those quarters where there is hope of relief—namely, government regulating agencies and the railroads themselves; and in the development by individual companies or company groups of alternate means of moving coal to market.

That is not to say that existing organizations, regional and national, are falling short of their responsibilities. In fact, they have wrung some small concessions from the railroads recently, mostly on fine-coal rates. But these agencies need renewed and unanimous support by producing and sales companies. Such solidarity can come from acceptance by individual companies and regional groups of the view that whatever helps coal in one area may well help coal elsewhere. Not to be overlooked also is the opportunity to convince the railroads that giving a little may produce as much gain in traffic and revenue as coal might gain by fairer rates.

The drive on rail-transport costs need not be limited to rates alone. Demurrage charges and the costs of cleaning dirty cars, both of which add up to substantial figures, might well be the subject of worthwhile negotiations with rail officials.

Opportunities for immediate cuts in transport costs, however, extend beyond the railroads. Growing river transportation is another string to coal's bow, with the promise of considerable savings through all-water or rail-water shipments. And in some special circumstances, trucking also shows promise of measurable savings.

Meanwhile, individual companies and the industry as a whole must press the search for wholly new transport methods. On the near horizon, for example, are long-distance pipe-line movement and overland belt shipment. If these projects eventually prove successful, they might well be considered by other coal producers individually or in regional groups.

The best solution, of course, is to eliminate transportation altogether. This can be done where some bulk consumers of coal are concerned—electric power plants, for example—by locating the coal-consuming facilities at the mine mouth. Coal producers can help themselves and some of their big customers by studying the feasibility of such locations and telling the facts to their customers.

10. Higher Quality

Keep quality standards high, and work to raise them.

Since quality ranks with price in determining product value and therefore in creating consumer preference, coal must continue to invest money in preparation facilities and seek new ways to meet consumers' needs. The penalty of neglect would be further attrition of coal's markets.

The aim should be quality that will sell the product and keep it sold. Whoever the customer may be and whatever his needs—low ash, low sulphur, low moisture or some combination—his wants must come first. For that reason preparation facilities as well as blending and loading facilities must be flexible. Yet the cost of preparing coal to his specifications must be held at a level that will keep the price right. For this, automatic and central controls that reduce labor costs are the answer.

For most coal users, consistency of quality is as important as the specifications themselves. Therefore, once specifications have been decided upon, vigilance is needed to hold to the mark. The best guarantee against slipping standards is periodic sampling and testing in a well-equipped laboratory.

High quality, once achieved, is not only a benefit to the customer. It also is an asset to the producer. When proclaimed in the marketplace, it is a persuasive merchandising help and a strong selling point. But it must be proclaimed, through advertising, through promotion, through satisfied customers and through talks across the fuel buyer's desk.

11. Wider Research Horizons

Speed research into new and better coal uses through wider and more substantial support of research activities.

Imaginative, hard-driving research, adequately supported, keeps an industry abreast of the march of progress and stakes out new claims in the future. From research come new shapes and forms for raw materials, new uses and new markets for basic and refined products, more benefits for consumers, and long life and better profits for producers and refiners of raw materials.

In research, is coal measuring up to its responsibilities for the present and its opportunities for the future?

Measured by the standards set by other industries, coal's effort is far from maximum, though gratifying progress has been made with limited support and limited funds.

Coal needs more thinkers, more physicists, more chemists and more engineers to guarantee its future through research. The only way to obtain those men and thus make the needed gains is to provide adequate funds, facilities and guidance. For more speed in bringing research to fruition, for wide explorations into new fields that promise gains for the future, and for integrated programming and minimum duplication of cost, more subscribers and larger subscriptions are a "must" for coal's research agencies. Meanwhile, for individual companies that have the vision and the funds for their own research, the promise of the future, for themselves and their customers, is bright.

12. More Safety for Workers

Spare no effort and overlook no way to improve safety.

Safety is a leading "must" for coal.

Where does the basic responsibility for safety lie? And what is the key to progress?

The key to progress is unrelenting effort, as is proved by the experience of the industry thus far.

Though coal must, and does, welcome help from others, the basic responsibility for safety always has lain, and still lies, with the management of the individual company. Today, fortunately, others want to help and are equipped to help—state, federal and organization safety agencies; the union; individual miners in increasing numbers; equipment manufacturers; and casualty and compensation-insurance companies. Granted, not all of these see eye to eye on every question but they do agree in principle and, in recent years, have moved closer to agreement in detail. Coal should miss no opportunity to enlist their help whenever it is offered or to seek to enlist it whenever it might be useful.

But though coal can draw on others, this does not relieve company management of its ultimate responsibility for safety or its obligation to be always constructive and agressive about safety. The policy and the task of management, therefore, must be to:

1. Buy and install the machines and equipment that guard men from danger.
2. Provide safety training for all workers.
3. Hold out incentives for safety achievements.
4. Seek opportunities for miners and their union, as well as other groups, to join in the safety effort.
5. Support and strengthen all safety agencies and exploit their services fully.

13. Equal Opportunity

Create attitudes in government circles that will accept coal on its merits and thus equalize opportunity among fuels.

In government circles, where officials not only buy coal but also determine policies that affect coal's markets, uninformed prejudice against coal as a fuel and blindness to the fact that national security hinges on abundant energy have deprived coal of opportunity to compete on equal terms with rival fuels. For instance, foreign-trade policy has created conditions favorable to the import of residual oil while refusing, at least until recently, to remove obstacles to the export of coal. Again, though coal is eager to serve the Tennessee Valley Authority now and in the future, TVA buying policies today, instead of perpetuating a strong, dependable coal industry to provide fuel in the years ahead, have driven coal prices down to a level where producers, forced to pass up depreciation and depletion charges to meet TVA's price demands, cannot hope to survive long on TVA business. Still again, the Atomic Energy Commission, shrugging off abundant coal supplies close at hand, now burns natural gas from distant fields at its Oak Ridge installations.

At the state level, West Virginia, sitting on top of the Nation's richest coal mines, only recently woke up to the fact that natural gas and oil have thrust coal out of many public buildings and institutions, with resultant attrition of that state's coal industry and injury to state revenues.

To create equal opportunity for coal, the industry must establish liaison and conduct intensive education at the high government levels where broad policy is made. Evidences that this approach brings results are the recent formation of executive-department committees within the federal government to study coal's needs and its role in the Nation's economy, and the provision made in August by the Foreign Operations Administration for export of 10,000,000 tons of coal to Western Europe. Meanwhile, West Virginia has begun a survey of fuels use in that state's public buildings and institutions.

With sustained effort over a period of time, directed at the top levels, coal eventually can win a fair hearing down the line, with far-reaching results taking shape in coal's relations with TVA, AEC, the Interstate Commerce Commission, the Federal Power Commission, the General Services Administration, the Department of Defense, and the agencies of the several states.

14. Self-Reliance for Self-Protection

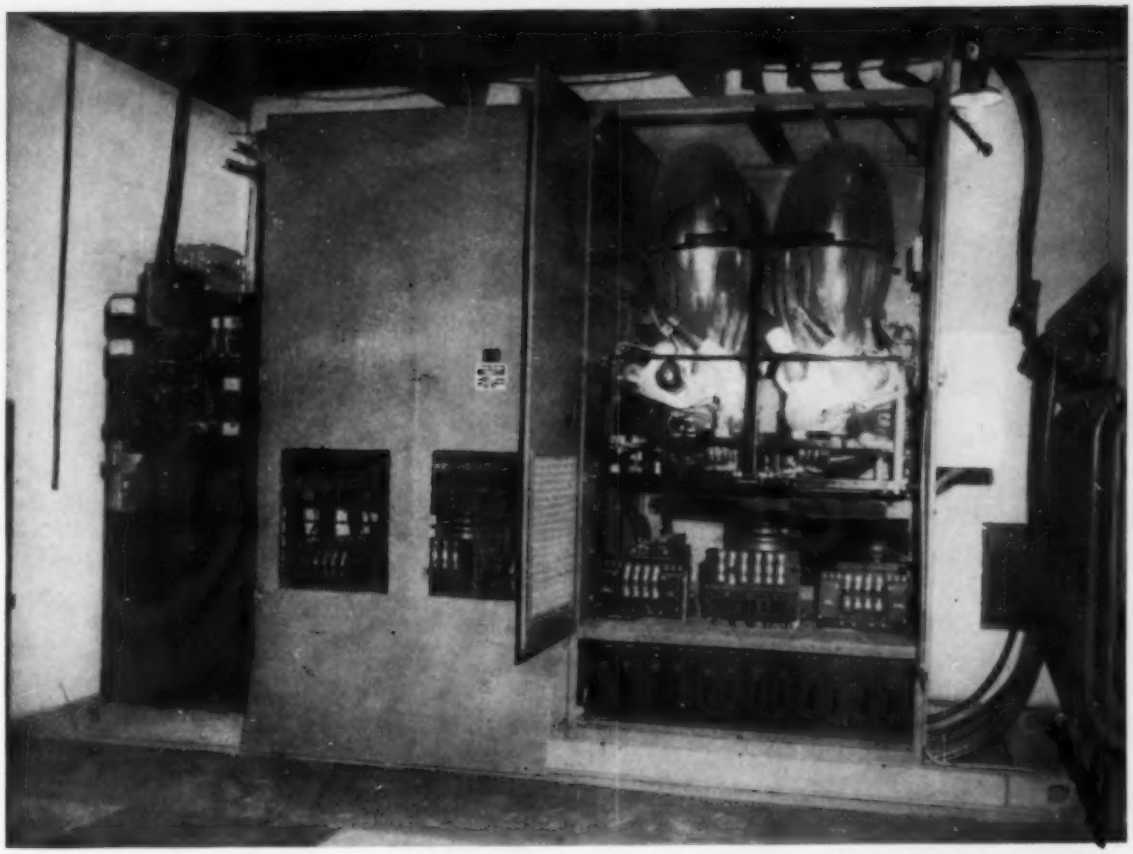
Muster industry and individual initiative to protect coal.

Coal can—and must—seek the help of others in forming and acting on programs to keep the industry strong, as stated earlier. Wherever these helps can be enlisted, they will shore up coal's position and strengthen the industry's influence.

But today's situation is not the kind that will permit the industry or any of its units to wait for others to make the rescue. In the final analysis, the major effort must be coal's because coal has the biggest stake in its own present and future.

Take the question of imported residual oil, for instance. In time, with sustained effort supported by outside allies, coal may obtain some protection in government circles and even some relief from the oil companies themselves. But coal itself must shape the lasting answer to residual-oil competition. The quickest answer lies in strong merchandising and selling backed up by quality and a cost-price structure that enables coal to meet and beat competition. A longer-term answer might lie in the purchase or erection by coal interests of an efficient oil-refining plant that will reduce output of residual from Venezuelan crude oil from the present figure of 60 to 65% of crude input to something like 20%. Rough estimates put the cost of such a plant at $30 to $35 million—conceivably not too big a figure for coal, which spends some $500 million per year for equipment, materials and supplies.

The task ahead is big, but it can be accomplished. It will not be accomplished by those who wring their hands and moan the industry's decline but by those who, spurred by their own self-interest, their confidence in coal and their concern for the Nation's welfare and security, grasp today's situation as the industry's greatest challenge and act with self-reliance and imagination.



GLASS TUBES are the heart of the new rectifier unit supplying power for haulage at Jamison No. 9 mine. Four tubes in each of two units provide a total capacity of 500 kw. Fans draw cooling air up through cubicle bases, louvered side walls.

Glass-Bulb Rectifier Passes Test at Jamison No. 9

Low installation and operating costs, with high efficiency and reliability, characterize over 1½ yr of experience with new 500-kw unit.

By D. A. HALEY, Electrical Engineer
Jamison Coal & Coke Co., Farmington, W. Va.

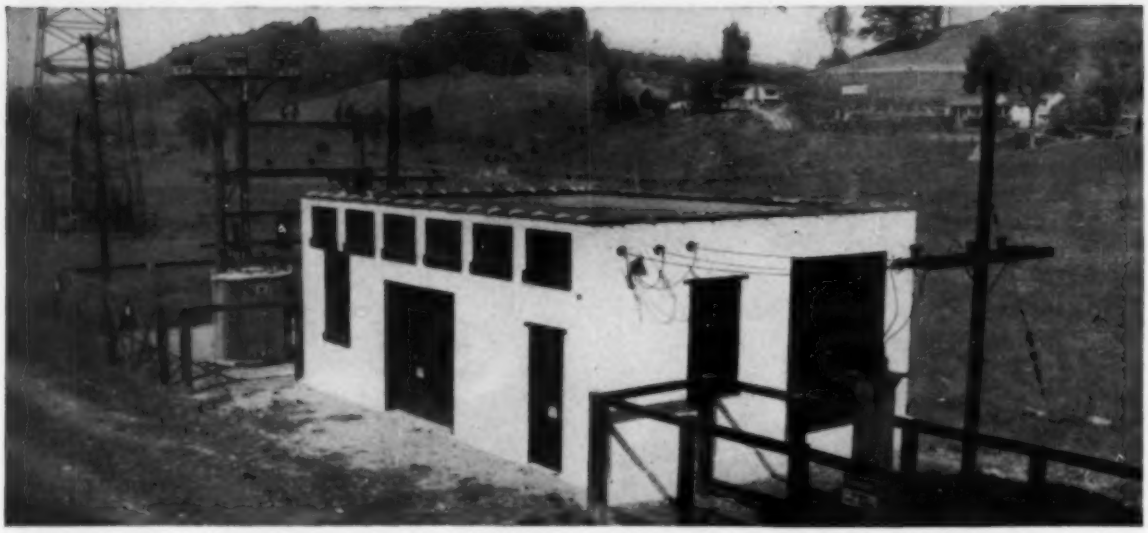
IN THE SPRING of 1952, a new sealed-glass mercury-arc rectifier was purchased for the No. 9 mine of the Jamison Coal & Coke Co. This mine is located at Farmington, W. Va., about 80 mi south of Pittsburgh, and recovers the Pittsburgh seam.

A number of electrical substations are required along the main line at Jamison No. 9 as a result of the long haul—about 5 mi from the farthest working place to the underground dumping point—and the large haulage locomotives—30 tonners. These substations, some outside the mine and some inside, are spotted to supply power for the loading sections as well as haulage, with a few primarily for haulage. The glass-bulb rectifier is outside, and is primarily for haulage.

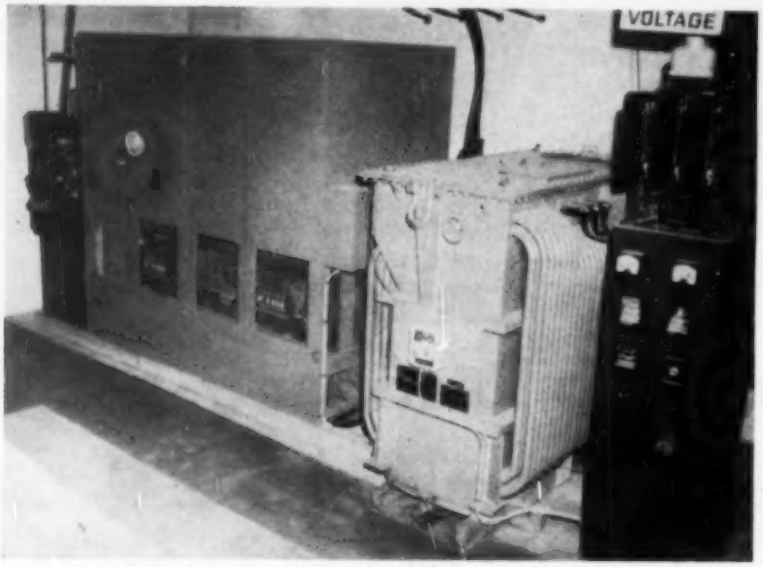
The new 500-kw rectifier was manufactured in England by the Hackbridge & Hewittic Electric Co., and is known as a Hewittic rectifier. The name Hewittic is derived from Peter Cooper Hewitt, inventor of the mercury-vapor, or Cooper-Hewitt, lamp, and later of the Hewittic glass-bulb mercury-arc rectifier. Hackbridge & Hewittic is the largest manufacturer of glass-bulb rectifiers in the world.

RECTIFIER DESIGN

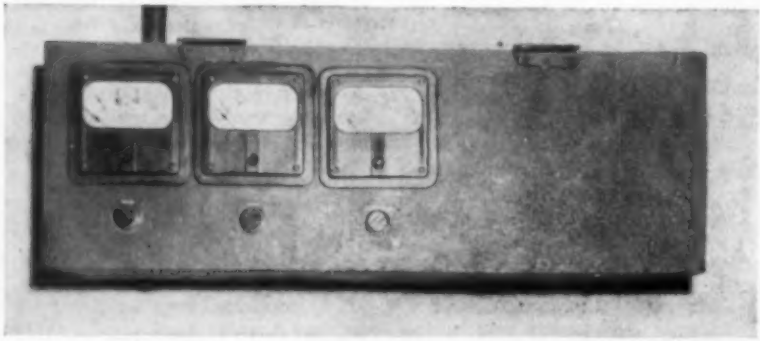
The rectifier consists of two steel cubicles with hinged doors. These cubicles act in parallel and operate as a single piece of equipment. Each cubicle can be broken down into four components: that is, four 3-phase sealed glass tubes, plus a simple start-



REMOTELY CONTROLLED RECTIFIER SUBSTATION is 1 mi from man portal, alongside 2,300-v borehole to mine.



COMPLETE RECTIFIER includes DC switchgear (left), two glass-bulb units, transformer, and AC switchgear.



LOAD MAY BE READ and station started and stopped from panel at man portal 1 mi distant from glass-bulb rectifier substation.

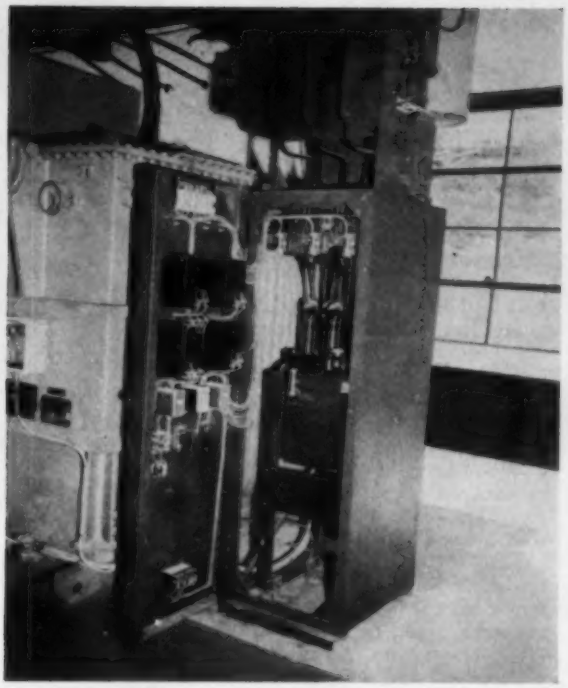
ing mechanism, the anode chokes and fuses, and a 2-hp motor-driven fan.

The heart of the rectifier is the transparent glass bulb. Glass is the ideal material for obtaining complete vacuum and is an excellent insulator. In the Hewittic bulb the seals are glass wrapped directly around the inlet electrodes, and both seals and conductor inlet rods have the same coefficient of friction, thus maintaining a constant vacuum at all times. It is not necessary to insulate the electrodes from the body of the vacuum chamber with the Hewittic bulb, since the glass body is the insulator itself. The bulb is manufactured of Pyrex, which resists high temperatures, is mechanically strong, and is free from deterioration in use.

Bulb design includes a very simple method of establishing an electric arc between the mercury pool, or cathode, and a graphite block, or anode. This electric arc, or "cathode spot," as it is commonly called, is initiated by inserting a rod carrying a small amount of current into the mercury pool and quickly pulling it out again. This operation is performed by electric solenoids mounted above and below the rod. It causes a small arc and the tube fires immediately—within two or three cycles.

When the tube fires it establishes an arc between the cathode and two holding anodes, which serve to maintain the arc. Then, when the DC breaker is closed, the arc is transferred to the main power anodes, which are equipped with individual time-delay fuses. The main purpose of the anode fuses is to open the circuit in case of arc-back, and they are readily

SHARP BENDS, long arc path, and no mercury condensation on anodes make arc-backs infrequent.



AC SWITCHGEAR, with cubicle door open, was designed and built in Jamison Coal & Coke shop.

accessible from outside of the cubicle.

The only moving part in the rectifier is a 2-hp motor which circulates air across the tubes to cool them and help condense the mercury. A saturable reactor in the 3-phase power source varies the fan speed from idling at no load to full speed at half load. The DC windings in the saturable reactor consist of a few turns of the main DC conductor, and are completely enclosed in the tank of the main transformer.

Aside from the two cubicles themselves, the rectifier consists of an automatic AC breaker, the rectifier power transformer, which is wound double wye with an interphase transformer, and an automatic DC circuit breaker.

OPERATING RESULTS

At the time of this writing, the rectifier has been in service for a little more than 1½ yr. During this period, simplicity of operation and low cost have been found to be its outstanding features. Jamison people are well satisfied with the results of experience with the use of the glass-bulb rectifier, and have found it trouble-free and highly efficient at low cost.

In the field of simplicity of operation, the sealed bulbs operate at ground potential, thus eliminating extra insulation of heat exchangers, tubes and piping. Also, the bulbs do not require vacuum pumps, water cooling, pressure gages or other complicated accessories.

DC CABLE entering mine through borehole, with remote-control cable leaving building upper-right corner.

Inspection of tube condition is easy and effortless as a result of the hinged doors of the cubicles and the transparency of the bulbs. Only a glance is required to tell if the tubes are operating. Unit construction permits replacing tubes in one cubicle while the other operates at 50% capacity.

Because of the extreme simplicity and durability of the Hewittic units, maintenance costs are exceptionally low. Many of these bulbs are known to be still operating after 20 yrs of trouble-free service. Our rectifier has now been in operation over 1½ yr, and aside from a few drops of oil on the fan motor, we have had no maintenance on it. However, in the rare event of a bulb defect, repairs can be made at relatively low cost. Hackbridge & Hewittic has opened a service shop in Montreal, Canada, for taking care of any necessary repairs, and this shop also carries an adequate stock of repair parts.

Among the other advantages of these rectifiers are their low initial and installation costs. The units are easy to handle and require no lifting equipment or special foundations. They are shipped ready to bolt together, and assembling them is relatively simple.

The rectifier is remotely controlled and operates completely unattended except for weekly inspection. The secondary current on the AC line-current transformers is stepped down to milliamperes, and, by means of pilot wires, is read on a milliammeter at the man portal about 1 mi away. A selector switch on the same control panel at the man portal controls a relay to open or close the solenoid-operated oil circuit breaker on the rectifier.

A New Method Of Breaking Coal

. . . What it is

. . . How it's used

. . . What its results are

BEFORE BREAKING, a 16-ft heading looks like this. Tube ends are flush with coal face. Chains on tubes aid recovery from loose coal.

Breaking Coal

AFTER BREAKING, coal appears like this. Method produces a larger percentage of lump sizes and a minimum of fines.

BETTER ROOF CONTROL, greater safety and increased production are top benefits from application of chemical coal breaking at the Orient No. 1 mine of the Chicago, Wilmington & Franklin Coal Co., Orient, Ill. Better than 500,000 tons of Illinois No. 6 coal has been broken with the new product since it was first put to work Aug. 11, 1953, and management is well pleased with the results.

Early in 1953, CW&F management studied Orient No. 1 to determine how a mine with only a few years life remaining could be maintained as an efficient operation. An area of thick coal remained in the southern section of the mine but only comparatively thin coal remained in the northern area. After weighing all mining possibilities, management decided to discontinue work in the thin coal and concentrate activity in the thick coal.

Concurrent with the decision to concentrate in the southern territory was a determination to adopt on-shift shooting. Since Illinois mining laws prohibit on-shift use of explosives, some method other than permissible powder had to be selected. Coincident with CW&F's change in mining plans was the emergence of Chemechol as a new method of breaking coal. As a result of favorable impressions received while visiting other coal mines using Chemechol, CW&F decided to use the new product at Orient No. 1.

Mining was concentrated in five double-shift sections, two of which were equipped with off-track equipment, and Chemechol was adopted for on-shift coal breaking. Output from these units, operating two shifts per day, averaged 3,955 tpd in March, 1954, up 42% from August, 1953, when Chemechol was first put into service. While management credits its concentrated work in the thick coal with most of the improvement, they also point out that section output has increased about 40 tons per shift since the new coal-breaking method has been used.

Roof conditions also have improved significantly since on-shift shooting with Chemechol has been practiced. Improvement is credited to absence of shattering around drill holes and better placement of holes because foremen can supervise drill crews more closely.

Another benefit credited to Chemechol is better loadability because the coal is more uniform in size. A 2% increase in the yield of plus 6-in lump has been noted at the preparation plant, while the number of extremely large blocks has become insignificant. Although management believes that there have been increases in the yields of other larger sizes and a corresponding decrease in the fines, figures are not available for comparison with past results. A complete change in sizes marketed has been made since Chemechol has been used and, therefore, management has not been able to make an accurate comparison.

Greater safety for workers is another advantage Orient management credits to Chemechol. No special precautions must be taken in handling or storing it other than keeping it dry and not damaging it by crushing. The chemical mixture can not be discharged by stray currents, heat or pressure. Mine voltage will not start

BETTER LOADABILITY has resulted in an average increase in loader output of 40 tons per shift at Orient No. 1.

With Chemicals

TWO-MAN CREW handles tube recharging and coal breaking. Supplies and tools for recharging are hauled in battery-powered truck.

the chemical reaction to functioning.

L. B. Buchanan is chairman of the board of the CW&F Coal Co., with headquarters in Boston. G. B. Harrington is president and general manager, with offices in Chicago. Other officials headquartering in Chicago include K. F. Towler, vice president and assistant treasurer; and B. R. Gebhart, vice president, sales. F. Earle Snarr, vice president, operations, has his office at Benton, Ill. Howard Schulz is superintendent of Orient No. 1, J. Camp is mine foreman and J. Baudino is electrician.

WHAT CHEMECHOL IS

Chemechol is a permissible coal-breaking medium that uses electrical energy to start a chemical reaction which builds up gas pressure in a steel tube. A steel disk is ruptured to release the gases which break the coal. Four main components of the device are: (1) a steel tube in which the chemical reaction and disk rupture takes place; (2) the Chemechol unit, which is decomposed to form the gases; (3) the battery controller that delivers the electrical current necessary to initiate the chemical reaction; and (4) a cable to conduct current from the battery to the tube.

The steel tube is 63 in long, 2$\frac{5}{16}$ in in diameter and weighs about 35 lb. One end is closed with an electrical plug equipped with terminals through which current is applied to the unit. The other enclosure is a 10-gage mild-steel rupture disk which is held in place by a head provided with ports for releasing the gas. Discharge pressure is approximately 20,000 psi and is controlled by the physical properties of the disk and the sharpness of the shear edge of the head.

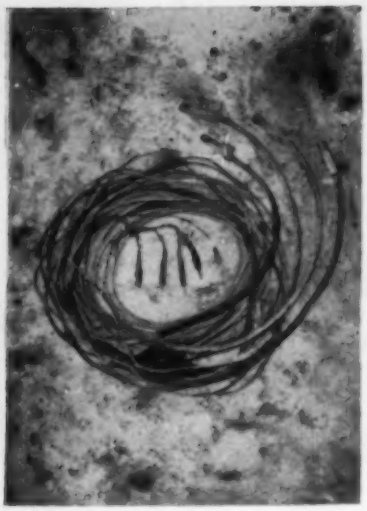
The Chemechol unit consists of about 1$\frac{1}{2}$ lb of a chemical mixture packed in a 1x40-in cylindrical paper shell. These units are packed in fiber containers and shipped as ordinary chemicals. No special facilities are required for storage other than to keep the units in a dry, well ventilated place where they are protected from damage from crushing and contamination by oil or grease.

A nichrome starter wire embedded in one end of the unit initiates the chemical reaction when a current of about 8 amp is applied for 7 sec. Ends of the wire are attached to a plastic adapter which closes one end of the paper shell. When inserted in the steel tube, this adapter makes electrical contact with the electrical plug at the end of the tube and is held in place by a seating device.

Gases generated by Chemechol are approximately 60% steam plus nitrogen and carbon dioxide. Noxious gases are reported to be only one-third of the upper limit of Class A permissible explosives. There is a small quantity of smoke generated and, although there is some odor, it is not harmful.

The battery controller consists of a 24-v lead-acid unit and controller for regulating current flow. The controller performs the following functions: (1) connects battery to Chemechol charge if the circuit to and through the unit is complete and within the proper resistance range; (2) delivers the proper current to the charge until the nichrome ribbon in the unit is severed, and then disconnects the control circuit from the charge by relay; (3) protects the battery and the parts in the control circuit in event of a short circuit; and (4) gives visual indication of normal and abnormal firing conditions.

When new and fully charged, the lead-acid battery has sufficient power to fire approximately 300 Chemechol units. Each battery cell is equipped with an information window which has three gravity balls—red, yellow and green—to indicate charge condi-



ELEMENTS of device (left photo) include head with 45-deg ports (left), tube body, plug with chain, shear disk and chemical unit. Lead cable (right photo) must be over 100 ft long. Outside ends plug into tubes, inside connect to battery.

STORAGE OF CHEMICAL UNITS and disks is at any convenient location and no special facilities are needed.

PROPER CURRENT for starting chemical reaction is delivered when the starter switch is depressed.

BATTERY RECHARGING is done on the section through polarized plug. Resistance reduces current to 1.1 amp.

tions in the cells. When fully charged all three float at the surface of the cell. Average useful life of the battery is 200 recharges.

Lead cables are 12-gage 5-conductor stranded-wire units insulated with plastic. Connectors used at the face are plug-in types designed to be blown away from the face at discharge, thus removing cables from the falling coal. Jack-box type connectors are used at the controller. Conductors are covered with green, blue, red, yellow and black insulation and all are enclosed in a yellow plastic jacket. The black wire serves as a common return for each of the other wires connected to four Chemechol tubes.

HOW ORIENT USES CHEMECHOL

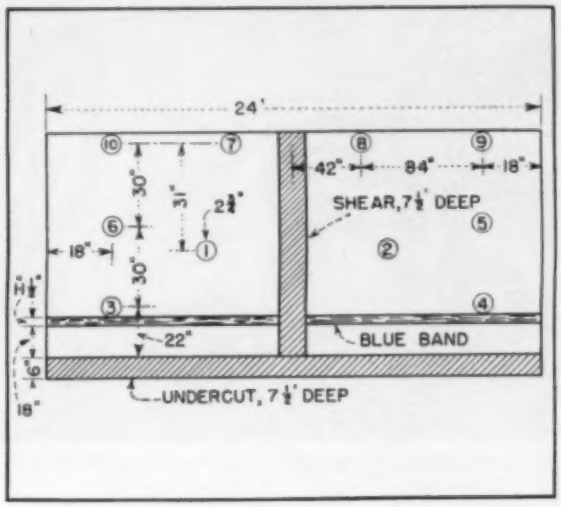
Tubes are handled on the section by one man, except on high-tonnage units where two men discharge and recover tubes. Materials for handling the coal-breaking job are hauled in battery and cable-reel-equipped trucks. Up to 228 holes have been loaded and discharged by a 2-man crew, during a regular work shift. On an average day, the crew loads and discharges between 175 and 200 tubes.

All drill holes in a working place are loaded with Chemechol tubes and four are connected to the 5-conductor lead cable. To permit all four to be connected, there are four 2-wire colored cables connected to the lead cable. Each of the 2-wire units has one wire connected to the black wire of the lead cable and the other to one of the other wires. Thus each tube is connected to an individual circuit.

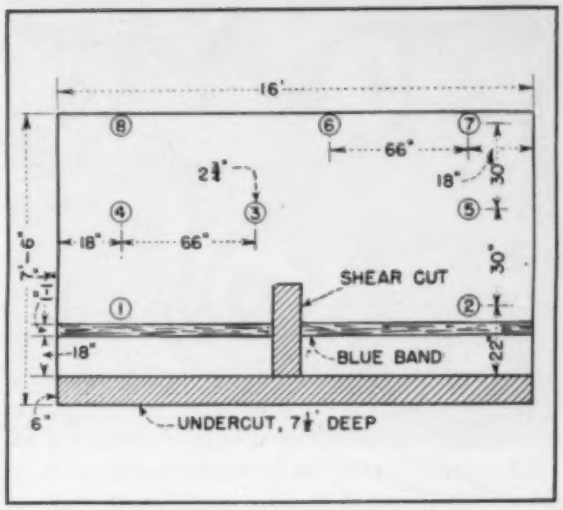
Tubes are discharged separately and in the proper sequence. Proper sequence is easy because the colored wires are used to identify the order of discharging. For example, the green wire always is connected to the tube to be discharged first, the blue to the second, the red to the third and the yellow to the fourth. The battery controller is constructed so only one tube can be discharged at a time.

OPERATING THE CONTROLLER

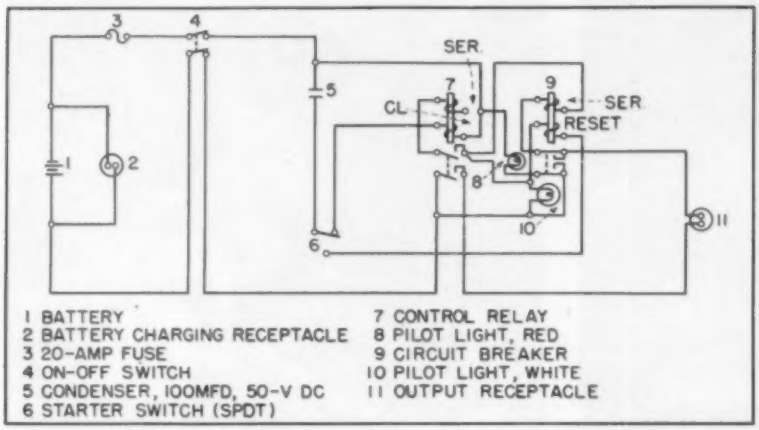
To operate the battery controller, a detachable key is inserted in the "on-off" switch and turned to the "on" position. A spring-loaded starter switch is depressed, held momentarily and released. As this switch is re-



DRILLING PATTERN and shooting sequence in 24-ft rooms is designed to get maximum efficiency from chemicals.



DRILLING PATTERN and shooting sequence in heading eight tubes where coal is undercut and partly sheared.



SCHEMATIC wiring diagram for controller shows how positive protection is provided in electrical circuit. Design permits current to flow only when conditions are normal.

leased, a white light appears in a sight glass, indicating normal flow to the Chemechol unit. If the white light is burned out, the controller circuit cannot be activated. When the nichrome starter wire in the chemical mixture burns through, the battery controller cuts off automatically and the white light goes out.

When a short circuit occurs in the cable or Chemechol tube, a circuit breaker in the controller opens, cutting off the current flow and a red light appears in the sight glass.

After the first four tubes have been discharged, they are recovered and another group is connected to the lead cable. Short lengths of chain are attached to tubes to make recovery from the loose coal easy.

Each section is provided with 30 steel tubes, two battery controllers, two cables and small repair parts. Expendable chemical units are delivered to the section in boxes containing 40 units. Disks are delivered in boxes containing 500 units. Chemical units cost 40c each and disks 2½c each.

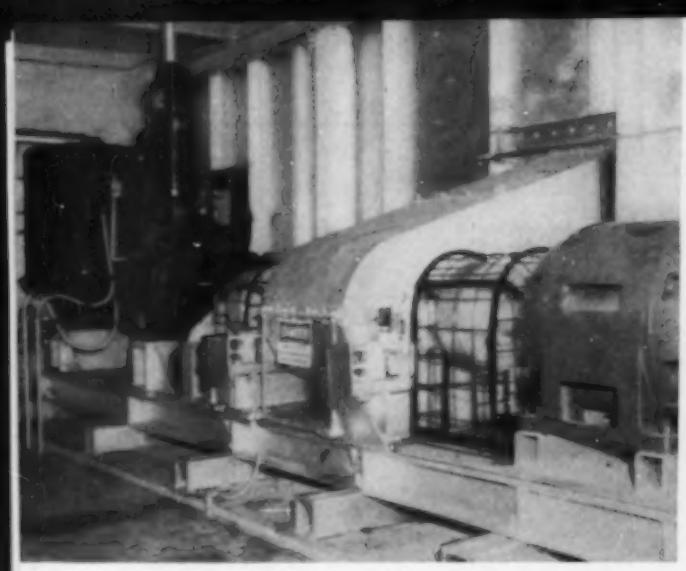
HOW THE BATTERY CONTROLLER ACTIVATES THE CIRCUIT

When the on-off switch (4) is turned on, the circuit is connected to the battery through the fuse (3) and the terminal strips. The contacts of the control relay (7) are then closed momentarily by actuating the starter switch (6), holding it briefly and releasing it. Operating the starter switch charges the condenser (5) through the reset coil of the circuit breaker (9) and the white lamp (10). If the white lamp is burned out, the controller unit cannot be activated. Releasing the starter switch discharges the condenser through the voltage coil on the control relay, closing its contacts for a fraction of a second. If the external circuit from the output receptacle (11) to and through the Chemechol tube is complete and within the proper resistance range of 2.5 to 3.5 ohms, current will flow through the current coil and hold this relay closed.

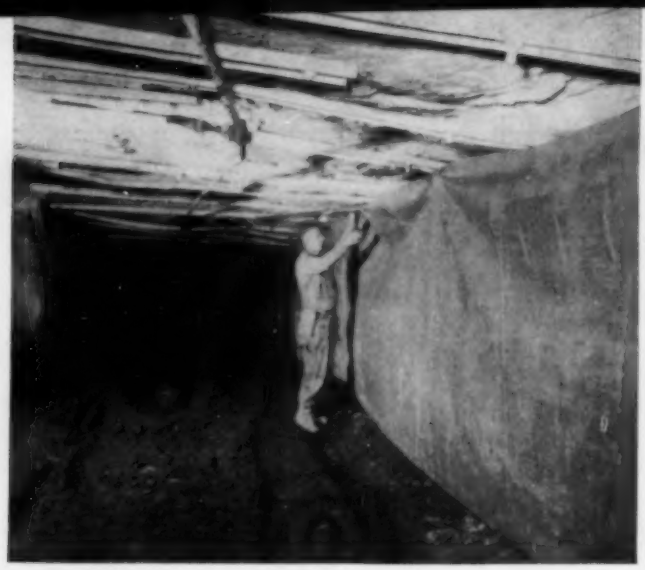
While the current relay is closed, current is delivered to the external circuit through the current coil of the circuit breaker and its normally closed contact. The white pilot lamp (10) will indicate that current is flowing.

The current is cut off automatically when the electrical current is broken in the Chemechol charge after the nichrome wire burns through and current no longer flows through the current coil of the control relay. Consequently, the control relay opens, disconnecting the output receptacle of the battery.

The current coil of the control relay is so designed that it will not hold the contacts closed unless at least 6.0 amp are flowing through this coil. Thus if the battery is discharged or the external circuit is abnormally high in resistance, this relay will not close in a normal manner. The circuit breaker will interrupt current flow in excess of 13.0 amp. When the circuit breaker opens, the red light (8) will be illuminated to indicate that some unusual condition in the external circuit has caused abnormal current flow in the circuit.



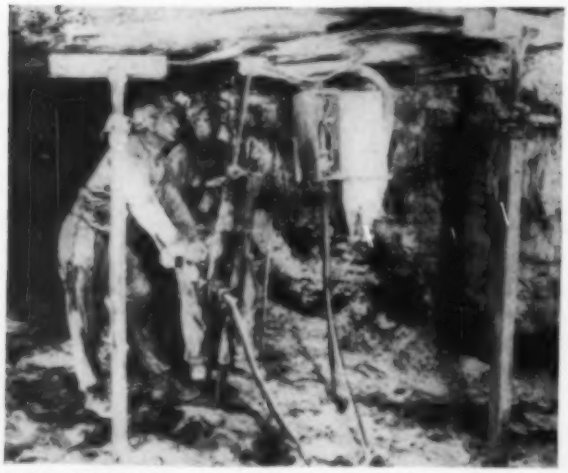
STANDBY DIESEL DRIVE insures fan operation.



LINE BRATTICE provides positive air to the face.

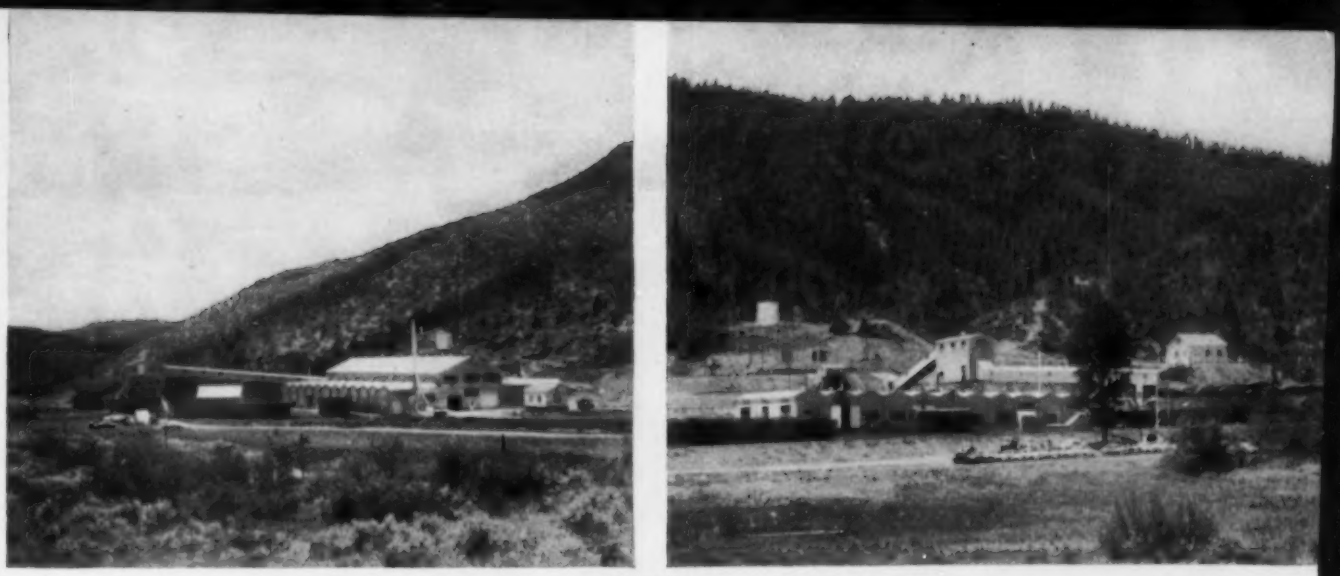
Positive Ventilation, Dust Control Promote Safety

DUST CONTROL in the working areas is provided by water, including sprays at shuttle-car transfers (left), and by thorough rock dusting with machines transported in shuttle cars, as shown at the right.



DUST COLLECTOR on the roof-bolting drill protects the health of the drill operators in Allen mine.

WETTING AGENT in spray water adds to the effectiveness of dust control in the dump pocket at the East Portal.



East Portal . . . 2 Mi . . . West Portal

DESIGNED for an ultimate production of 5,000 to 6,000 tons of good coking coal per day, Allen mine produces from two portals and supports mining and preparation with up-to-date facilities for safety, handling men, maintenance and supplies.

Service for Modern Mining

How Allen mine backs up modern production facilities underground with equally modern facilities for making operations safer and more convenient, for keeping equipment on the job and for supplying the mine at minimum cost.

ASSUMING a new completely mechanized underground mine with an ultimate capacity of 5,000 to 6,000 tons per day, what is required in the way of facilities for supervisors and men, for safety, for maintenance and for handling materials and supplies? At the new Allen mine of the Colorado Fuel & Iron Corp., the answer to this question, as well as to equipment and methods, was arrived at as a result of more than 5 yr of study and investigation of facilities at more than 40 going mines throughout the country. The tests in all instances were safety, convenience and minimum manpower requirements, all coming together in minimum cost.

Allen mine, and the Allen seam which it was built to mine, were named for Charles A. Allen Jr., chairman of the board. The mine is located in Stonewall Valley 30 mi west of Trinidad, Colo., and supplies coking coal for the company's Minnequa steel plant at Pueblo, Colo. The seam is a member of the upper series of the Laramie formation and is a good coking coal. Sulphur is exceptionally low. Preliminary preparation only is done at the mine, with final washing at the coke plant operated in connection with the Minnequa works. Mining and preparation equipment and methods are summarized in the panel (p 88) accompanying this description of personnel, safety, maintenance and supply practices.

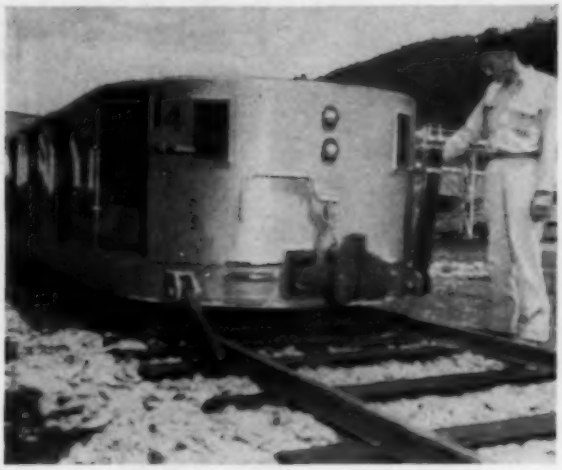
Promoting Safety

The Colorado Fuel & Iron Corp. has long been a leader in safe operation of mines and steel works, and safety was a major goal in the design and operation of the new Allen mine, which is expected to carry on in the tradition of the company's Morley and Frederick mines, which were recently presented with Joseph A. Holmes Certificate of Award along with an award to all the company's coal mines in recognition of safety achievements. Another measure of safety achievement is the record for the three corporation coal mines in the first 6 mo of 1954, as follows: frequency, 11.25, compared to 29.64 in the same period in 1953; and severity, 0.654, compared to 0.787 in 1953.

Among the things contributing to prevention of accidents at Allen mine are the following:

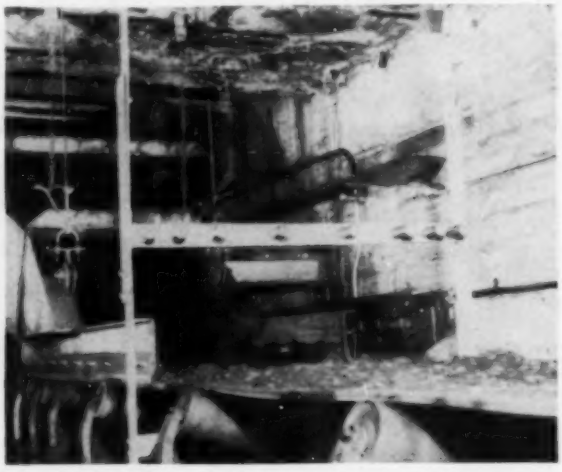
Employee Participation—Allen mine employees and supervisors were among the 1,250 men at the corporation's mines that recently participated in voluntary 100% first-aid training with the cooperation of the United Mine Workers, the Bureau of Mines, Trinidad Junior College and the corporation management.

A Joseph A. Holmes Safety Association chapter was recently organized at Allen mine, following in the footsteps of the corporation's Frederick and Morley operations. The Morley chapter, in fact, came into being over 20 yr



SAFETY, COMFORT AND CONVENIENCE in transporting men are attained by special covered man-trip cars (left), equipped with safety drags for slope operation. Drags also are used with all other trips operating on the slopes.

ELECTRICAL SAFETY is promoted by special circuit centers (illustrated) and grounded-neutral AC systems.



EQUIPMENT PROTECTION at Allen mine includes tramp-iron detector on shock belt feeding slope belt at East Portal.

ago and has been active continuously since that time. A major benefit of chapter operations is open and honest discussion of accidents and preventive measures. Chapter meetings are well attended. Refreshments are served buffet style and door prizes are given.

Three well-trained and equipped rescue teams are kept in readiness at each of the corporation's mines, and receive refresher courses every 90 days. Equipment consists of 10 McCaa, self-contained oxygen breathing apparatus, as well as 14 MSA all-purpose gas masks. MSA self-rescuers are kept at each belt head in Allen mine, and part of the safety education program is training of men in the proper use of this equipment.

Roof Control — Both conventional timbering and roof-bolting are called upon for protection at Allen mine, with the main reliance on bolting, using CF&I split-rod and wedge bolts. Top conditions are not too good, and consequently, to insure maximum protection, standards have been adopted for both bolting and timber support—the latter primarily in the shaker-conveyor sections in the pitching area on the west end of the property. In the east end, single posts frequently are set along the ribs in rooms to give an indication of roof working and weight.

Channels are used with bolts in many areas, particularly in entries and airways where top conditions are more adverse than usual. Drilling is done with I-R stopers, Liddicoat throwaway bits and United Engineers dust collectors. I-R impact wrenches are used for tightening nuts.

Dust Control—Approximately 5 lb of rock dust is applied per ton of coal produced at Allen mine. MSA skid-mounted dusters are used, and are transported in shuttle cars equipped with a special take-off plug for the DC motors on the rockdusting machines. Normally, enough dust is applied to keep the incombustible content of the dust samples at approximately 80%.

Water is piped to all working places, using Victaulic couplings in the lines for speed in installation and dismantling, for application on cutter bars and elsewhere as needed, including sprinkling during loading. Transfer points—for example shuttle-car to belt transfers—are equipped with sprays. Water lines — and also air lines — are hung in J-hooks suspended from roof bolts.

Ventilation—Only a slight amount of gas is encountered in Allen mine but all face equipment is permissible and

EMERGENCY PROTECTION in case of explosion is provided by self-rescuer depots at various points underground.

FIRE-FIGHTING FACILITIES include hose stations and extinguishers.

Protecting Men And Equipment

CO-OPERATIVE EFFORT keys safety work. CF&I Inspector F. S. Leonard (left) and S. G. Walker (right), chairman, mine safety committee, work closely with each other and with outside authorities, including I. J. Ratliff, federal inspector (second from left), in charge or organizing Holmes safety chapter, and with R. T. Reay, also a federal inspector, in safety education and elimination of hazards.

air is coursed to each working place where necessary by means of brattice lines. Each working section is on a separate split, with overcasting for positive control without the use of doors.

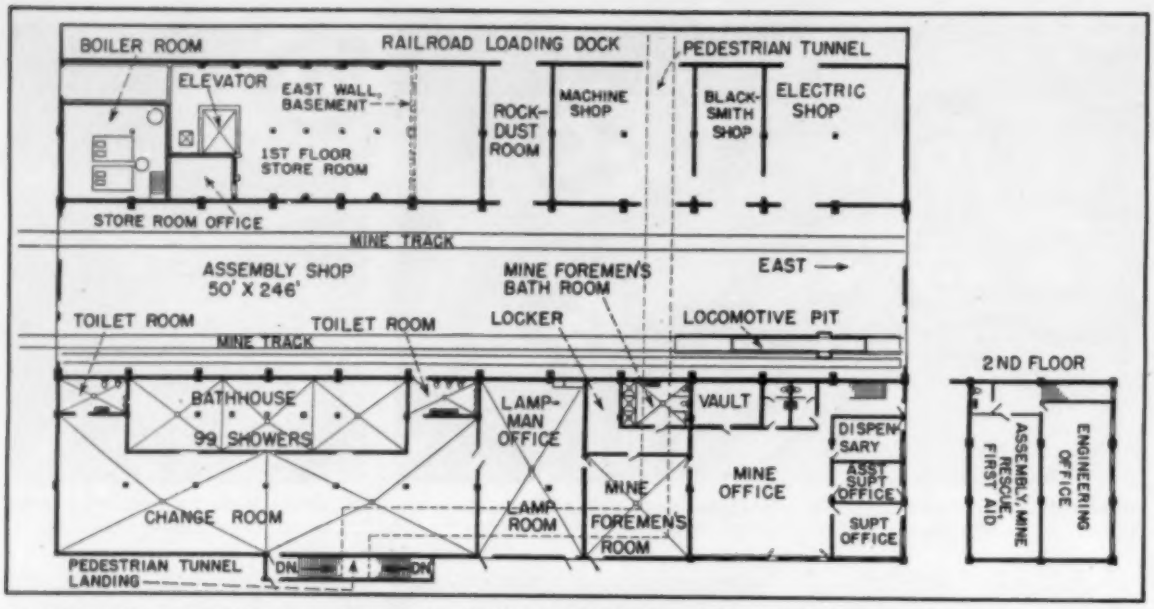
Air is supplied by Jeffrey 12A-83 Aerodyne fans, one at each portal and each equipped with an automatic standby drive. The drive consists of a Caterpillar diesel with Rawson centrifugal clutch. As the fan slows down for any reason, a second clutch between the electric motor and the drive throws out and a battery automatically starts the engine. When it picks up to speed, the clutch engages automatically — in fact before the fan has slowed down to half speed.

Electrical Protection — Allen mine uses 250-v DC for haulage and 440-v AC for the operation of all other equipment underground. All units are frame grounded, and the AC power lines are provided with grounded neutrals. Joy Safety Circuit Centers provide this and other protection for men and equipment in the distribution of electrical power to the face.

Trolley wires are protected at all crossing points with U. S. Rubber plastic guards. High-voltage 4,160 AC is brought in by buried cables. Trailing cables (A. S. & W. Tiger Brand) are Bureau of Mines recommended and pass the Pennsylvania Department of Mines flame test. Cables are taken out of service after 3 to 5 splices for reconditioning and vulcanizing.

Man-Trips — Special Differential man-trip cars, each holding 38 men, are used for moving men into and out of the mine. Drags are used on the slopes which the trips traverse at both portals, being dropped on each ascending trip. Drags are raised for lowering trips, but a foreman on each such trip has the responsibility of dropping them if an emergency should arise. In addition to the regular Willison automatic couplers, safety chains are used between the man-trip cars, and also on all supply cars. Drags are used on all ascending coal trips at the West Portal, as well as on all other trips at both portals.

Haulage Safety—In addition to provisions previously listed for slope operation, haulage safety is promoted by Joy electric switch throwers and reflector buttons on the Ramapo-Ajax switch stands to show switch position. Nos. 4, 5 and 6 turnouts, long curves, creosoted ties and 90-lb rail further contribute to smooth safe rail haulage. Downhill belts on grades over 10%



CONCENTRATED SERVICE FACILITIES were the goal in the design of the industrial, or service, buildings at Allen mine. Shown is general arrangement of East Portal building, including offices, change facilities, shops and supply house.

are equipped with magnetic brakes activated by solenoid switches, as well as roller switches, for overspeed protection.

Protection of equipment at Allen mine also has received careful consideration along with protection of men. An example is a "Detramp" tramp-iron detector (Industrial Physics & Electronics Co., Salt Lake City) on the "shock belt" which feeds the main slope belt. This sensing unit stops the shock belt and vibrating feeders and sounds an alarm in case large pieces of steel should be loaded with the coal or rock. It prevents material such as roof bolts, drill steel, etc., from reaching the big slope belt.

Fire Protection — With 115 extinguishers at 103 locations so far, and with water lines and hose connections at strategic points, Allen mine is still improving its facilities for fighting possible fires both underground and on the surface. The system includes a 5-sheet monthly report on the location and status of fire-fighting equipment, including extinguishers, water lines, hoses and hose connections.

Extinguisher protection is extended not only to stationary units and equipment but also to all moving equipment such as, trucks, trolley locomotives and so on. Types are fitted to the types of fires that might be encountered, and include: 2½-gal Fyr-Fyter nonfreeze; 4-lb Ansul dry chemical; 1- or 1½-qt and 2-gal carbon tetrachloride; Kidde 15-lb CO_2; and 2½-gal Foamite.

Five fire plugs are installed at the West Portal, with hose stations in the shop, warehouse, under the tipple, at the top of the breaker, and at the tipple control panel. At the East Portal, seven plugs plus hose stations in the shop, prop yard, first floor of tipple, and at the slope belt drive provide similar protection. Fire-plug locations are shown on the East Portal plan elsewhere in this article.

A water line and five fire plugs are installed along the slope belt at the East Portal for supplying 2-in fire hoses. In addition, 2½-gal nonfreeze extinguishers are installed every 100 ft, for a total of 16, including two along the "shock belt" from the dump pocket on the bottom. Panel belts underground are paralleled by water lines with hose connections every 200 to 300 ft, in addition to dry-chemical extinguishers at the head and tail pulleys.

Concrete and steel construction reduces the fire hazard in surface structures, while underground the fire hazards are minimized by such steps as fireproofed substations, oil depots and the like.

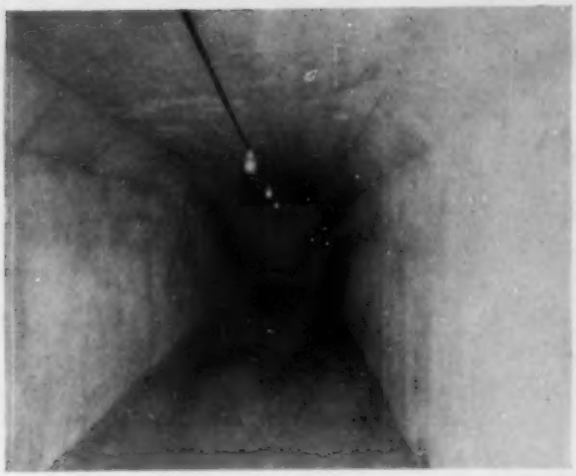
Personal Protection—In addition to safety hats and shoes, all employees wear American Optical safety goggles at all times when working or traveling except when specifically excused by a responsible supervisor. Such excuse is granted only in unusual instances. Goggles, including prescription-ground types as necessary, are provided by the corporation to the employees at actual cost.

In addition to the regular protective equipment worn at all times, MSA self-rescuers in necessary quantities are kept at each belt head in the mine, and are moved each time the belt is moved.

Inspection—In addition to state and federal inspectors, CF&I employs its own inspector — F. S. Leonard — who checks and reports on both the physical condition of the mines and equipment, and on working practices. He co-operates closely with not only state and federal men but also with the mine safety committee. At Allen, the safety committee is headed by S. G. Walker, who, among other things, accompanies state and federal inspectors on their visits to the property. The same practice is followed at other CF&I mines in line with the corporation's objective of enlisting maximum employee participation in safety work.

Handling Men

With seam and other conditions dictating two distirct types of mining equipment and methods, two separate portals were considered the best answer to efficiency under these varied conditions. The two portals are 2 mi apart and each is in effect a complete operation in itself, though the workings will be connected underground and both portals with their accompanying facilities are operated as one mine.



TUNNELS under the railroad tracks and service centers at both East and West portals permit employee parking out of the mine area and at the same time provide convenient, covered access to change rooms and offices.

Convenience and Safety Keys in Handling Men

CHANGE ROOM at East Portal is next to shower room and features windows and skylights of corrugated plastic.

With, in effect, two separate operations, even though operated as one property, it was natural to provide separate service facilities at each portal to take care of men, maintenance and supplies, with one—the East Portal—serving as headquarters. These service facilities at each opening are largely concentrated in "industrial," or service, buildings housing supervisors' quarters, wash and change facilities for miners, shop facilities and supply houses.

The buildings are Great Lakes Steel prefabricated units assembled into the complete service units by Western Marketing Corp., of Denver. They feature corrugated plastic skylights and windows instead of the conventional glass skylights and windows. Smaller separate prefabs are used as oil houses and combination oil houses and garages, while a concrete-block structure in a draw between the two portals provides powder and cap storage distant from the two plants and from the state highway on the opposite side of the valley.

With the East Portal serving as headquarters, a 2-story brick section was built into the southeast corner to house the following:

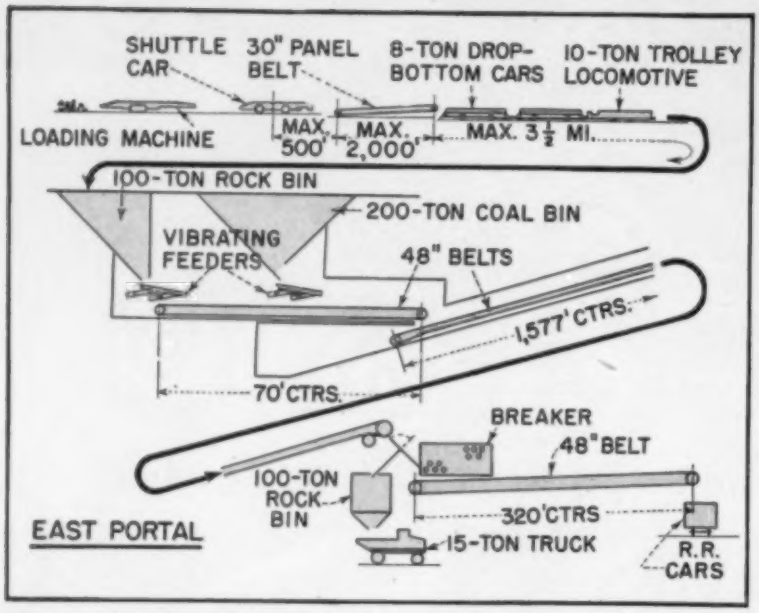
First floor – Superintendent's office, assistant superintendent's office, general office, record vault and medical dispensary.

Second floor—Engineer's office, and assembly, first-aid and rescue-training room.

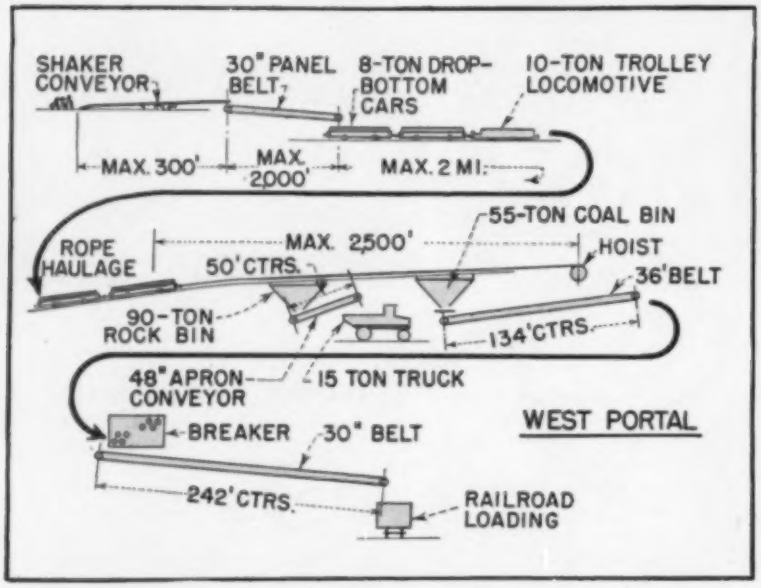
PERSONNEL CONVENIENCES

The service buildings at both the East and West portals at Allen mine are south of the railroad tracks. Employee parking facilities are provided to the north to make it unnecessary for men to drive across the tracks and park in the utility area. This brought up the problem of men having to walk across the tracks, which was solved by concrete underpasses at both portals, sloped to drain to the north and provided with vaporproof light fixtures. At the exits on the south sides, stairs lead up to the doors to the change rooms. Ample parking thus is provided in a convenient location without interference with surface activities and men are provided with safe, covered routes to the change rooms and offices.

Allen-Mine Equipment and Methods



COAL FLOW at the East and West portals reflects choice of mining equipment to meet the specific conditions encountered underground.



Seam and Conditions

Allen, 4 to 6 ft; average, 60 in; fair to poor top of drawslate 1 to 18 in thick, with upper strata predominantly black or coaly shales and sandstones; drawslate varies from good sandstone to a soft, wet, shaly formation containing many hidden slips and faults preventing roof-bolting; cover, 400 to 1,100 ft; average, about 550 ft; pitch, due east, varying from as high as 35% at the western outcrop to 2 to 4% a mile east; local undulations and faulting result in local grades up to 8% over or under the average.

Coal Openings

Two portals, one in the pitching area and a second 2 mi east in flat area; West Portal—15% mine-car slope down the pitch; hoisting of coal, men and materials by 12,000-lb Vulcan single-drum hoist; two 150-hp G.E. motors; East Portal—30% belt slope, 1,577-ft Link-Belt conveyor, 48-in U. S. Rubber nylon belt receiving coal from "shock belt" under 100-ton rock bin and 200-ton coal bin equipped with Syntron Twin-Dual vibrating feeders with controllers for feed rates from 150 to 700 tph; maximum belt capacity, 700 tph at 400 fpm with 450-hp motor; present drive, 250-hp 440-v G.E. motor for 350 tph at 300 fpm; also 30% man-and-materials slope 1,500 ft long with hoist the same as West Portal; slopes, Utah Construction Co.; bins and concrete work, Ozzello Construction Co.; steel work, Park Construction Co.; both slopes at East Portal 8 ft high and 12½ ft wide, roof-bolted and Gunited.

Ventilation Openings

At West Portal, 14-ft circular air shaft 40 ft deep, concrete lining; East Portal, same type, 400 ft deep; fans at both shafts Jeffrey 12A-83 Aerodynes with Caterpillar diesel standby drives automatically engaged by Rawson centrifugal couplings; present volume with 50-hp G.E. motors, 125,000 cfm, 1.2-in water gage, at West Portal, and 100,000 cfm, ½-in, at East Portal; ultimate fan horsepower, 150.

The change room at the East Portal includes benches and Channon overhead clothes baskets for an ultimate total of 700 men if ever desired. At the West Portal, which will produce approximately one-fourth of the ultimate output, the change house can accommodate 200 men. The plastic skylights and windows, plus fluorescent fixtures on the walls provide ample light both day and night. Shower rooms open off the change rooms, and plenty of shower heads are provided to cut down waiting time. The total at the East Portal, for example, is 93. Water for all purposes is stored in a 65,000-gal steel tank on the hillside above the mine yard at the East Portal. Showers are served from hot and cold tanks mounted in the building framework above the shower room.

At the East Portal, also, toilet facilities are provided in two separate rooms, one at each end of the shower

Tailored to Seam Conditions

Mining Plan

Panel entries with rooms turned both ways; panel entries first driven to limit and then pillars mined on retreat. In East Portal workings, with off-track equipment, rooms are driven 12 to 14 ft wide on 60-ft centers for 100 ft and then widened to 24 ft; maximum depth, 290 ft. Pillars are mined by driving a pocket across leaving a 6- to 8-ft fender for final recovery.

Three-heading panels in the pitching western section are driven by a Goodman 660 loader feeding to Long Piggyback conveyors, Long room conveyors and panel belt, since operating regular off track equipment on these pitches was considered too hazardous. Final mining is done by shaker conveyors in the crosspitch rooms.

Face Equipment

West Portal—In addition to entry-driving unit listed previously, Goodman L-20 shaker conveyors with No. 1½ troughing feeding to Goodman 97-30 30-in panel conveyors with U. S. Rubber Giant belts and 50-hp motors with overspeed protection; belts reversible for taking supplies up the pitch; cutting by Goodman 512 short-walls with bugdusters, 9-ft bars, transported on Joy trucks when necessary; Stanex and Goodman throwaway bits; drilling, Chicago post-mounted and Crichton flexible-shaft units, Sulmet bits; shooting with duPont Duobel C, Hercules detonators.

East Portal — Similar panel belts, without, however, overspeed trip or reversing equipment, since pitch is low and supplies can be delivered by Baker-Fletcher tractor-trailer units; Joy 11-BU loading machines and 6-SC 4-ton shuttle cars; Sullivan 11-RU cutting machines; air drilling of shot holes. Cutter bits are CF&I conventional with Haystellite tipping; same bits used on loading machines requiring bits. Cutters also equipped with power take-offs for conventional drilling. With universal machine, most of the cutting is done in the few inches of bone and coaly shale under the drawslate, which falls and is pulled out by the cutter bar for separate loading. Where there is no drawslate, places are both cut and sheared.

Roof Support

Predominantly CF&I split-rod-and-wedge bolts with 4-in channels where extra protection is required, as in long-lived headings and aircourses; previously drilled 3x5x18-in cap pieces are used in short-lived places. Approximately 800 bolts used daily in lengths of 4, 4½ and 5 ft, with 5½- and 6-ft bolts when necessary. Timbering is done mostly in the western section, in First South panel workings where shaking conveyors are used because of heavy pitch.

Joy portable compressors and I-R stopers and impact wrenches are employed in drilling and installing bolts, with dust collection by United Engineers units. Bits are Liddicoat throwaway—1⅞ in for starting, followed by 1⅜- and 1¼-in for finishing.

Mainline Haulage

Track—48-in gage, 90-lb CF&I steel on creosoted ties; Nos. 4, 5 and 6 turnouts with manganese frogs; Joy electric switchthrowers with Ramapo-Ajax reflector-type switch stands.

Cars—Allison Steel dropbottom, 300 cu ft, 8 tons; 21 long center-to-center of couplers, 7 ft wide, 44 in high; spring suspension; Willison automatic couplers; Card Iron Works wheels with Timken bearings; parking brakes.

Men and Materials — Differential covered man-trip cars, each holding 38 men, equipped with safety chains and drags for slope operation; Differential flat-bed supply cars, likewise with chains and parking brakes.

Locomotives—Goodman 10-ton trolley locomotives designed for single or tandem operation; each locomotive, two 75-hp motors, 5,000-lb drawbar pull at 8 mph, 33-in steel-tired wheels; dynamic, hydraulic and hand braking; MSA Minephones. Trips are spotted and controlled at belt heads by Joy car puller hoists.

Preparation

Plants at each portal for preliminary cleaning and loading; final cleaning done at steel works in Pueblo. Plants furnished by McNally Pittsburg.

West Portal—Coal hoisted in cars is dumped into 55-ton bin; mine rock into separate 90-ton pocket. Coal conveyed by 36-in belt conveyor to 9x17-ft Bradford breaker for breaking to 1⅛ in and removal of hard refuse. Second 30-in belt moves coal to loading station similar to that at East Portal.

East Portal—Slope belt delivers to 6x14-ft vibrator for separation into plus 3-in, 3x1⅛ and 1⅛x0 sizes. Plus 3-in may be delivered to a house-coal bin or combined with 3x1⅛ and delivered to a 9x22-ft Bradford breaker for rough cleaning and reduction to 1⅛x0. The breaker product, with the natural 1⅛x0, is conveyed to the loading station for loading on any of three railroad tracks by push-button-controlled flop gates in pants-type chutes. All equipment is interlocked and one operator at a panelboard in the breaker house controls all the units. One operator at the railroad-car loading station controls the cars with two air-operated and one electrical car droppers.

Power

Two substations, one at each portal, receive power at 44,000 v and transform it down to 480 v for distribution for surface equipment, and 4,160 for underground substations, via 2/0 cable buried in the bottoms of the slopes.

AC at 480 v, supplied by 300-kva General Electric portable transformer substations, powers face equipment through 500,000-cir mil feeders and 4/0 3-conductor cables. All AC lines are operated on a grounded neutral.

DC at 275 v for haulage is provided by Westinghouse 300-kw mercury-arc rectifiers, also supplying most of the shuttle cars. Additional facilities for shuttle-car service include two 30-kw Celab selenium rectifiers, each capable of serving two cars.

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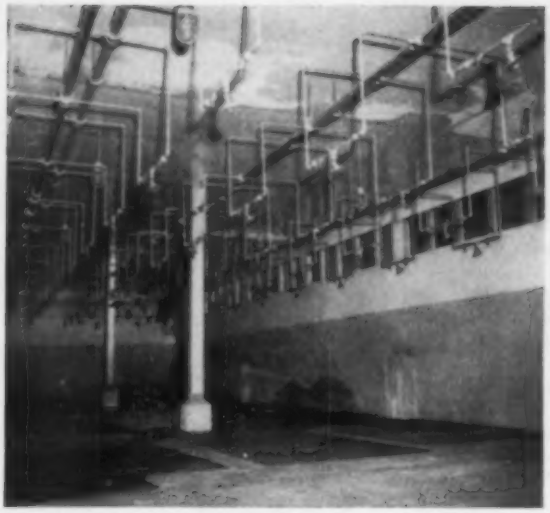
room. One opens into the shop and warehouse area for the convenience of personnel in these departments. This arrangement also saves the time of these men as well.

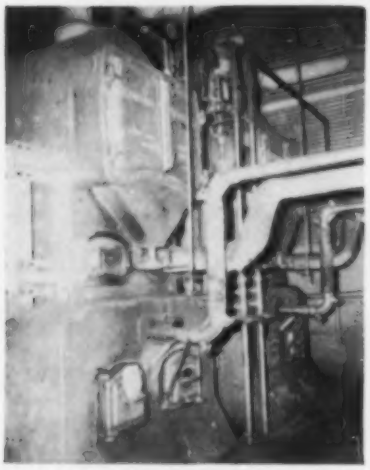
Lamp rooms are next to the change rooms and between these rooms and the foremen's offices, which are provided with their own lockers, shower and toilet facilities. Dispensing MSA Model R-4 lamps, the lamp rooms are provided with latest-type self-service racks, as well as work benches for the maintenance of both cap lamps and safety lamps. The foremen's offices are fitted with desks for writing reports.

Hot water and heat are provided by two Kewanee boilers and Iron Fireman spreader stokers at the East Portal, and by a single boiler with Whiting bin-feed stoker at the West Portal. Both plants are completely automatic, including hold-fire controls. Coal is received directly by chute at the West

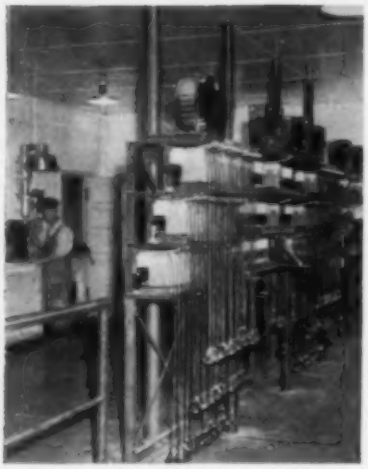


PLENTY OF SHOWER HEADS and toilet facilities in seprate rooms at each end of shower room are added conveniences for employees at the East portal, including shop and supply men in quarters next to change room.

Design and Equipment Assures Low-Cost Service



TWO AUTOMATIC BOILERS provide heat and hot water at East Portal.



SELF-SERVICE LAMP ROOMS include this West Portal installation.

Portal, and by truck at the East Portal which also is equipped with an elevated ash hopper.

Maintenance and Repair

Prevention of machine breakdown is emphasized at Allen mine, rather than repair afterward, and in line with this principle, mechanics are stationed in each section and parts depots are provided at strategic locations. Greasing is done on the third shift by special greasing crews using hand guns. And, although parts are not charged to each individual unit, a record is kept of delays, major repairs and overhauls to determine if abuse or mishandling is resulting in unnecessary breakdowns and maintenance expense.

As far as possible, repair and maintenance is done in the working areas, with surface facilities primarily for overhaul and major repairs which cannot be done conveniently on the job. The present schedule for overhauls is approximately 1 yr for cutting machines and 6 mo for shuttle cars and loading machines.

For overhaul and major repair, shop facilities are incorporated into the service buildings at both the East and West portals, with the largest unit at the East Portal from which the majority of the production comes. The 50x246-ft East Portal shop is in the center of the service building, as shown in the accompanying floor plan, with employee facilities to the south and the warehouse and special maintenance bays to the north.

Two mine tracks extend completely through the East Portal shop, with the one on the north also serving for loading of supplies onto cars for movement into the mine. The south track is provided with a pit at the east end for locomotive and other maintenance. Rollup doors at both ends of the shop are large enough to permit entrance of the diesel yard locomotive, mobile crane, or standard motor trucks. Illumination is provided by fluorescent fixtures along each wall. A 10-ton P&H overhead crane takes care of handling materials, parts and assemblies. This crane can operate anywhere in the shop.

Three bays north of the main shop, and at the east end, are equipped for the following operations: (1) machining and metal working, (2) blacksmithing and related operations, and (3) electrical repairs.

A concrete apron at the north end of the shop, with drains, permits cleaning equipment outside before it comes into the shop, and cleaning is done with Homestead-Yeager electric-steam units. In overhaul, parts as necessary are moved into the bays to the north for reconditioning and then are brought back for reassembly into the machines.

Facilities include equipment for forging and reconditioning drill steel and electric-steam vulcanizers for all

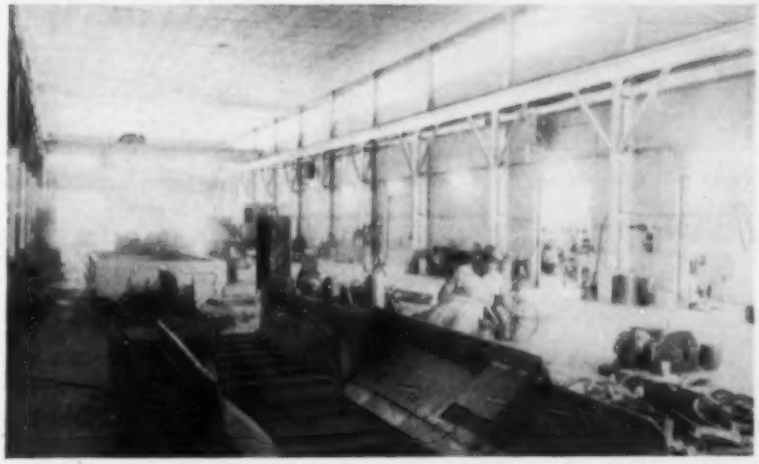
MAIN SHOP at East Portal occupies center bay of service building, with offices and change room in front and supply house behind.

STEAM CLEANERS, as at West Portal, facilitate maintenance.

Modern Facilities Promote Maintenance Efficiency

sizes of electric cables used at the mine. Trailing cables normally are removed after splicing 3 to 5 times for repair and reconditioning on the surface. Splicing equipment includes both Velocity Power and Burndy units, using sleeve-type connectors.

Tires on all rubber-mounted underground equipment are completely liquid filled, including shuttle cars, cutting machines, compressors and battery-powered supply trucks. The main advantage, in the light of Allen-mine experience, is that leakage can be eliminated and pressure maintained indefinitely. This leads to better tire life. The only failures since the start of water-inflation, have been caused by cuts, punctures and normal wear. Steering is easier and the operators of the equipment report that it rides as well as on air. Tires, mounted on wheels, are filled in the mine shop by a special pump.



EAST PORTAL SHOP is equipped with 10-ton bridge crane and is adjacent to special repair bays (near right) and supply house (far right).

Supply Handling

With, as noted, in effect two separate operations, supply-handling facilities, like other facilities at Allen mine, are provided at both portals. The goal in warehouse design, yard layout and handling facilities is convenience with minimum manpower.

The general layout at the East Portal is shown in the accompanying illustration. The yard is to the west, and the warehouse, with docks and other facilities, is in the northwest corner of the service building.

INVENTORY CONTROL

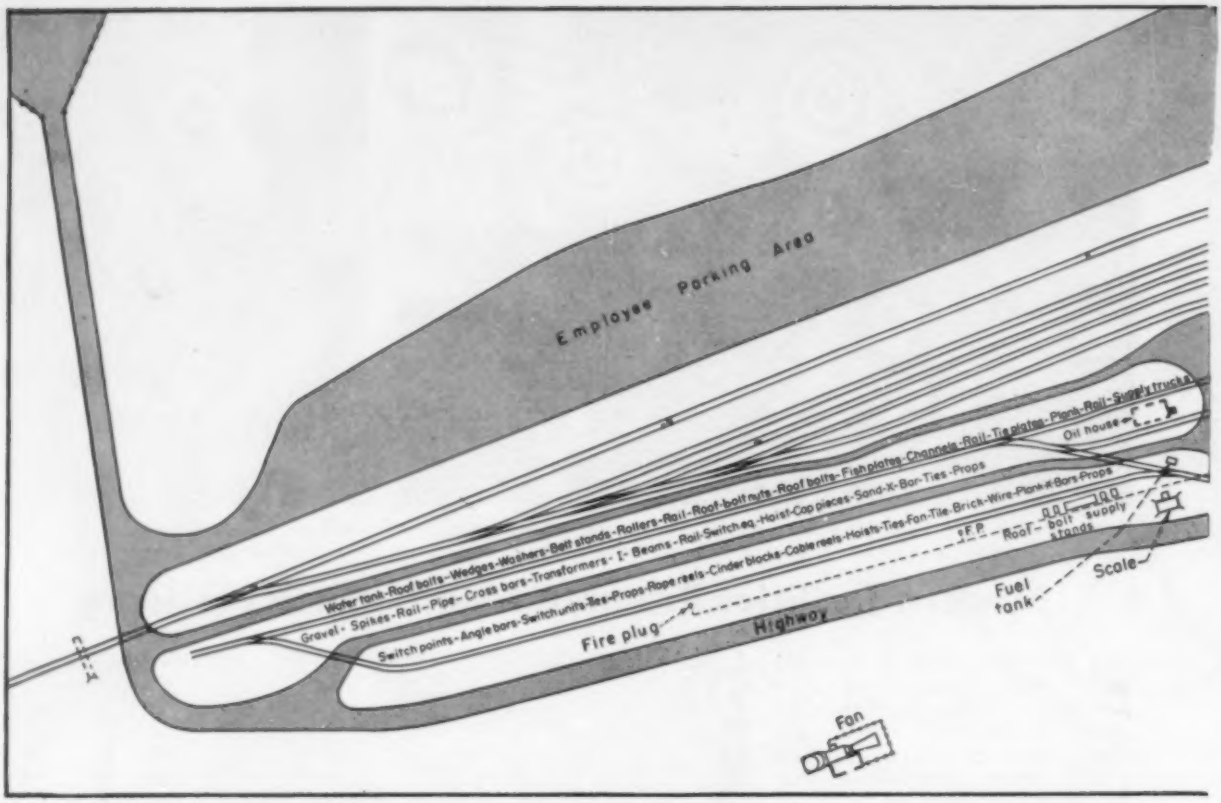
Supply control at Allen mine is based on the perpetual-inventory system, using tray-type card files by Remington Rand and Kardex. Supplies are issued only on signed requisitions, and receipts and costs, disbursements and cost, and quantity on hand are shown on the cards at all times.

The individual cards are equipped with red and green flags at the bottom for convenience in reordering and in preparing monthly distribution sheets, which show issuance by account numbers—for instance shuttle cars or timber, each of which has its own account number. The green flag, for example, is moved to the center of the card when the first item is issued after the monthly distribution report is completed. The red flag is moved to the center when the quantity on hand gets down to the point where reordering is necessary. In reordering, which is done once a week, and in preparing the distribution report each month, it is only necessary to check the cards with the flags at the center. Otherwise, it would be necessary to look at each card, with corresponding increase in time necessary for checking.

Physical inventories are made once a year as a check on the operation of the card system and to provide figures for the annual operating report.

RECEIPT AND STORAGE

A "house track" parallels the north side of the storage building and out-



EASY ACCESS and convenience through the use of mechanical handling facilities were the goals at the East Portal.

Yard Facilities and Distribution of Equipment Team Up

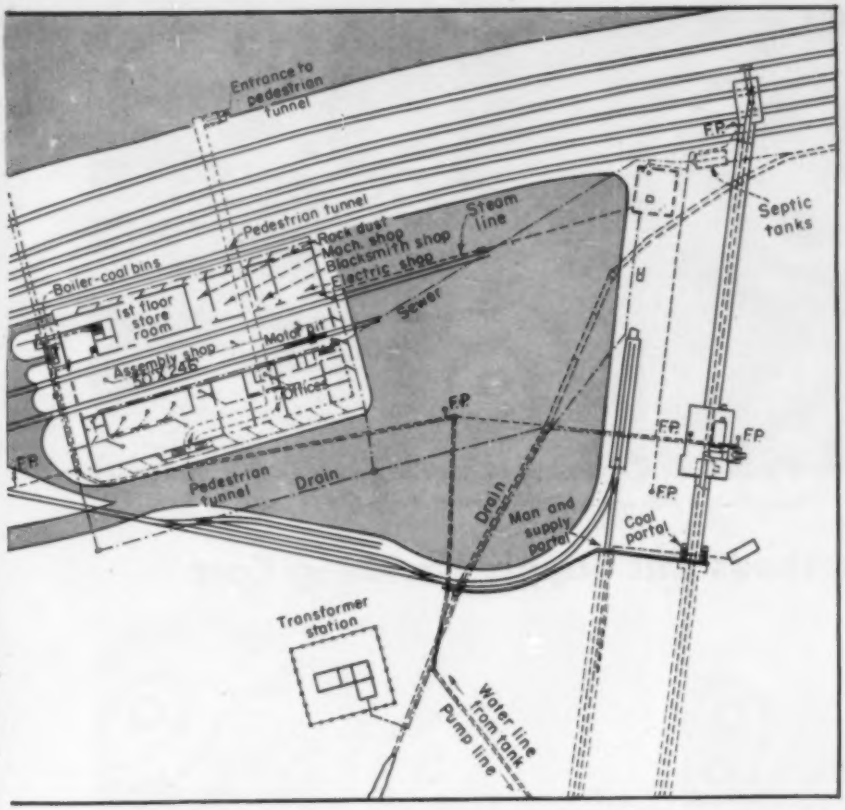
DESIGNED FOR MECHANIZED OPERATION, East Portal supply yard is adjacent to railroad track with truck roads to all areas. Oil house at front.

side yard for convenience in receiving materials and supplies in railroad cars, and a concrete dock at car height along the entire north side of the building makes for convenience in unloading into the warehouse. For truck shipments, a roll-up door at the northwest corner permits unloading directly into the warehouse, or the materials may be unloaded onto the main railroad dock at the west end. The same approach serves for loading ashes from the boiler plant into the refuse truck for disposal.

As shown in the illustration, supplies can move into the warehouse for storage in the parts section or in the separate cement and rock-dust bay, or they can be taken directly through to the supply track at the north side of the shop. Both wooden and sectionalized steel bins are used for storage of small parts and supplies, with rotary and drawer-type cabinets for very small materials.

Heavier items are stored on the floor in a special storage section. Special provisions are made for storing belts and other rubber goods by means of a basement section under the main warehouse. Reels of belt and cable, for example, are unloaded on the dock and are lowered to the basement by a 25-ton hydraulic elevator equipped with safety gates. Among other things, basement storage provides the coolness necessary for keeping rubber goods in tiptop condition.

Oil Storage—Separate prefabricated buildings with concrete floors and vaporproof fixtures are provided for oil



including open yard and supply house incorporated into the service building.

For Efficient Supply Handling

BATTERY-POWERED TRACTOR-TRAILER UNITS relay supplies from rail to face in all except the high-pitch sections at Allen mine.

storage. The building at the West Portal is combined with a truck and ambulance garage. At the East Portal, the building includes truck-height double doors at one end for the receipt of oil and grease by truck. Another door on the side along one of the mine tracks permits convenient loading onto supply trucks for routing into the mine.

Normally, full drums of oil are sent into the mine only when changing the oil in shaker drives. Otherwise only small cans or pails holding only enough for the day's use are employed. To fill oil cans, drums of lubricant are placed along one wall of the oil house on castor-mounted tilting-type individual racks. The tilting feature, plus castor-mounting, permits easy placing or removal of drums, and also easy placing of racks in their proper position.

Sand Handling—Motor sand at present is received and sent into the mine in oil-type drums.

YARD STORAGE

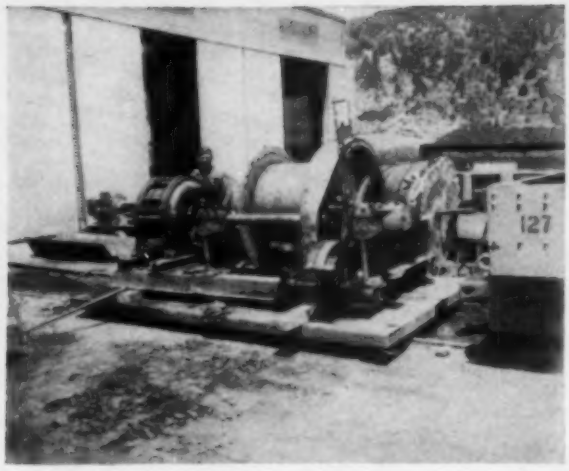
Convenience and the use of mechanical handling facilities were the keynotes in planning yard storage at both portals. The East Portal plan, with items in storage on the day the mine was visited, is shown in the accompanying illustration. Like the service building, the storage area is south of the "house track," and is paralleled in order by a 13-ft roadway, a mine track, another 15-ft roadway, a second mine track and the main highway into the service area.

The roadways (dark shading) permit trucks and mobile-crane access to all parts of the yard for unloading, placing and loading all types of equipment and materials. Roads are maintained by a Caterpillar D-6 tractor with blade and drag, which also is used for other surface operations, such as skidding, car-pulling and so on.

Except for light stuff in small quantities, handling of equipment, parts and materials in the storage yard is turned over to a Bucyrus-Erie Hydrocrane mounted on a GMC truck. Facilities include a clamshell, which also can be used for handling such items as a shaker angle trough, and a fork-type grab for timbers, roof bolts, rails and similar items. Use of the grab makes it possible for two men to unload a railroad car of creosoted ties, for example, in less than 1½ hr. The reach of the crane is sufficient to lift material out of cars and deposit it clear across the first south mine track.

A major contribution to flexibility in storage and handling in the yard is the use of diesel locomotives, permitting the elimination of all trolley wires and removing with them one of the hazards of operation. In fact, there are no trolley wires anywhere on the surface except for a few hundred feet at the West Portal, extending from the First South opening to a rope-trip landing.

The East Portal yard includes at the east end a platform for such items as kegs of nails, spikes and roof-bolt nuts, and racks for roof bolts at the right height for rolling the bundles of bolts



SPECIAL DELIVERY FACILITIES include belt truck (left) and machine carriers (right), used singly or in tandem.

Mechanized Methods Cut Supply Handling Cost

YARD FACILITIES include racks for roof bolts with platforms for kegs of nuts, bolts, spikes and the like.

UNLOADING DOCK along house track facilitates receipt of supplies, with small dock at corner for truck shipments.

onto the supply truck. A Diamond T truck is used for miscellaneous handling of items around and between the two portals. Other truck equipment includes two 15-ton Euclids, one at each portal, for refuse disposal in an area between the two portals.

SUPPLY DELIVERY

In addition to the general-purpose truck, the mobile crane also may be used to move parts and materials around on the surface and into the shops. Most of the handling on the surface, however, is done with flat-bed mine-gage trucks moved by 14-ton Davenport diesel locomotives, one locomotive at each portal.

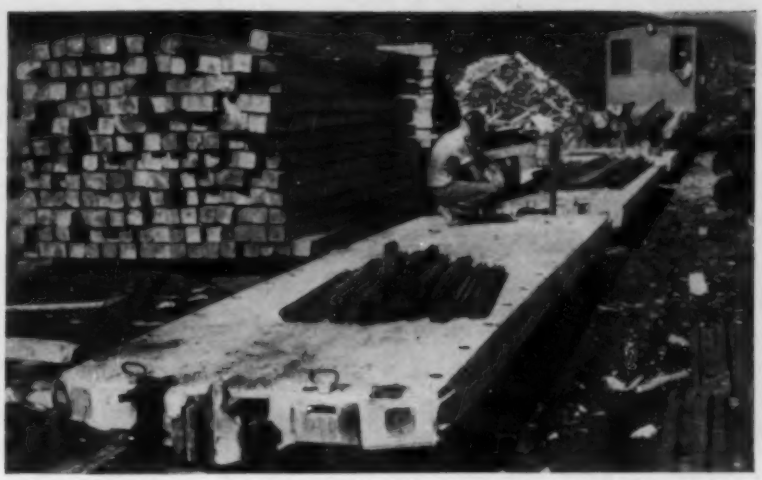
The flat-bed trucks, 18½ ft long, 6 ft wide and 15 in high, supplied by Differential, and also the regular drop-bottom mine cars, are used for delivery of supplies to the mine, the latter primarily for timber and ties. Practically everything else is delivered on the flat-bed trucks, provided with dimpled decks and holes for stakes. In addition to parking brakes, these cars are equipped at the mine with safety chains on each corner for additional protection in lowering and hoisting up the slopes. Two cars together may be used for moving rails, long bars and the like.

Special Trucks—In addition to the regular flat-bed trucks and mine cars, special equipment includes Fletcher belt trucks with 7½-hp motors for operating the turntables, and also Joy and mine-developed carriers, some in tandem, for loaders, cutters, shuttle cars, car-spotting hoists and other such heavy machinery.

Oil Delivery—Oil, except for drums when changing shaker drives, is delivered to the lubricant stations underground in 5-gal GI cans, which have been found a highly satisfactory type of equipment. Only enough is delivered for a day's use, and this applies also to grease, which is taken down in the original pails with wire handles.

Underground Distribution — Baker-Fletcher battery-tractor-trailer units are employed for distributing supplies and parts to the face in both the flat and pitching areas of the Allen mine. An exception in operation in the more steeply pitching sections is reversing the panel belts to take materials to the working places.

PERPETUAL INVENTORY includes tray storage and flags on cards.



FLAT-BED TRUCKS moved by diesel locomotives are mainstays in assembling supplies and moving them to and into the mine for distribution.

OIL HOUSES are provided with caster-mounted tilting racks. GI cans are used for oil deliveries to the mine.

WORKING ANYWHERE in the supply yards at both portals at Allen mine, mobile crane "is the handiest thing on the job" and reduces labor to a minimum.

ALLEN-MINE MANAGEMENT—A. E. Pagnotta (seated, left), mine foreman, West Portal; John Dale, mine foreman, East Portal; Leonard C. Ford, general mine foreman; and L. W. Ingles, superintendent; standing, left, John Hamilton, outside foreman; Joe Owens, chief electrician; Willis Turner, chief clerk; L. E. Battiste, resident engineer; and Tony Zappanti, master mechanic.

EXTENSIBLE BELT with self-propelled drive and tail sections provides continuous haulage from the continuous miner to the outside. Unit travels 400 fpm.

Extensible Belt Conveyor Carries Coal 1,000 Ft

The first 30-in extensible belt conveyor built, teamed with a continuous miner at Mech Mining since June, 1954, transports coal 1,000 ft. The longest extensible installation in the coal industry to date, the belt also is the first such type unit used in highwall mining.

By A. E. FLOWERS
Associate Editor, COAL AGE

HIGHWALL CONTINUOUS MINING is marking up new gains at the Mech Mining Co., Kittanning, Pa., where a continuous miner and a new-type 30-in extensible belt conveyor have been added to recover coal 1,000 ft beyond the highwall. Mech Mining has been pioneering continuous highwall mining since January, 1953, with a remotely controlled miner and articulated conveyors (*Coal Age*, January, 1954, p 64), and added the present equipment in June, 1954. The new installation is the first time an extensible belt has been used in a 1,000-ft length and the present conveyor is the first 30-in extensible unit put in service in the coal industry.

WHERE IT OPERATES

The scene of operations is about 12 mi north of Kittanning, Armstrong County, Pa., near the original remotely controlled miner setup. Operations are in the comparatively hard Upper Freeport seam which, in this location, is 48 in thick and has a 1-in parting about 6 in above the bottom. Previously, the area had been strip mined to a 50-ft highwall.

HOW THE COAL IS MINED

Present mining equipment at the new installation consists of a Jeffrey Colmol, Joy 30-in extensible belt conveyor, Barber-Greene rubber-mounted elevating conveyor and three 12-ton White trucks. Auxiliary equipment includes the following units: rubber-mounted power generator, truck-mounted shop, belt-storage truck with hoist, fuel truck, air compressor, and crane for handling the protective steel hood at the highwall.

Preparation for mining consists of removing loose material from the foot of the highwall and the pit floor in the area selected for mining. To handle this type of work, there are available an Allis Chalmers HD 19 bulldozer and two Tournadozers with 15-yd Caterpillar scrapers, as desired.

Before the Colmol attacks the coal, a steel protective hood is placed against the highwall by a Wayne crane. The continuous miner then starts boring into the seam at a 75-deg angle, discharging coal onto the extensible conveyor. The rooms are driven 75 deg with the highwall to tap a previously mined area and permit water to drain from the present mining area.

To comply with the Pennsylvania mining law and keep equipment moves to a minimum, the first room was driven 100 ft deep, after which the equipment was retracted and moved to a new highwall position. The second room, on 13-ft centers, was driven 200 ft with breakthroughs angled through on 50-ft centers. Each succeeding place was driven an additional 100 ft until the mining limit was reached. Breakthroughs are cut regularly on 50-ft centers as development progresses and are driven only far enough to provide a 3-ft opening. Straight posts are set in them as soon as the miner returns to the room face.

As the conveyor is retracted, intermediate sections and idlers are stored in breakthroughs for later use in the new room adjacent to them. Thus when full depth is reached, no idlers or stands will have to be hauled to the face as the belt is extended.

1 **SECTION OF BELT IS PLACED** on stand before belt is fully extended so 100-ft addition can be made quickly.

2 **SPLICING NEW SECTION** in conveyor line is done quickly by two men. Splice is joined by steel cable.

Adding 100 Ft of Belt in 3½ Min

3 **BELT IS UNSPOOLED** after splice is made and transferred to takeup cluster in drive section.

4 **FINAL CONNECTION** completes addition of belt. Lawrence Shaffer, superintendent, looks on.

The continuous miner is connected to the extensible belt by an 11-ft transfer belt conveyor which pivots on a ball-and-socket joint at the miner and moves in guides over the tail section of the belt conveyor. The transfer conveyor can be disconnected from the continuous miner by loosening an eccentric lever. The transfer unit permits a smooth movement of coal to the extensible conveyor, and also permits an 11-ft forward or backward movement of the continuous miner without moving the extensible belt. It also permits the miner to work at an angle, with the belt straight.

Femco phones installed on the drive and tail sections of the belt permit communication between the face and the outside.

The continuous miner cuts a 9½-ft by 46-in passageway, leaving several inches of top coal which helps protect the comparatively soft overlying shale. Some small local falls of rocks have occurred but no major ones have been encountered and there has been no evidence of weight on the highwall or on underground pillars. Management also reports that there have been no pillar falls in any of the highwall continuous mining areas since operation got under way better than 1½ yr ago.

One operator and a helper are assigned to the continuous miner, and a third underground man handles maintenance and adds intermediate sections to the extensible belt. On the outside, one man is stationed at the belt head to direct truck loading and help add belt as needed. Completing the crew are three truck drivers and a mine superintendent.

Output from the new installation is hauled 4 mi by truck to the Colwell preparation plant on the Pittsburg & Shawmut R.R. The coal is sold by the Pittsburg & Shawmut Coal Co., Kittanning, Pa.

MINING RESULTS

Since the continuous miner and extensible belt team was put to work in June, 1954, it has proven its merit in economically recovering larger areas of coal which could not be mined at a profit in any other way. About 70% of the available coal is recovered, comparing favorably with that obtained

CONTINUOUS MINER bores 46 in of coal from Upper Freeport seam at new Mech Mining highwall installation.

TRANSFER CONVEYOR between miner and belt permits belt to remain straight while the miner cuts breakthrough.

ONE MAN controls loading and handpicks coal before it is delivered to trucks.

CONVEYOR DESIGN FEATURES include limber rollers and easily connected lightweight tubular framework.

with conventional methods. Current rate of advance of the continuous miner is 18 in per min and has been steadily improving as the crew becomes more seasoned. The method permits uninterrupted flow of coal from the face to the trucks except when the miner must be retracted to start a new room or breakthrough, or to add belt.

HOW THE BELT OPERATES

The extensible conveyor is the first 30-in unit built by the Joy Mfg. Co. and also is the first installation where belt is added on the top, or carrying, side. A complete description of an underground installation of a similar 24-in unit appeared in *Coal Age*, June, 1954, p 88.

The 30-in unit is made up of self-propelled head and tail sections. In starting position, with no intermediate sections installed, these units carry 195 ft of belt. One hundred feet of belt is wrapped around a cluster of nine take-up pulleys in the drive section.

As the Colmol advances, the operator of the self-propelled tail section moves the conveyor ahead. The forward motion acts against the hydraulic takeup, causing it to contract and release more belt. If the continuous miner moves backward, the hydraulic takeup operates automatically to retract the belt.

As the conveyor becomes longer, specially designed lightweight tubular intermediate sections are installed. Troughing idlers are new-type limber rollers, which consist of a series of rubber disks moulded around a flexible wire rope. A sealed-type bearing attached to each end of the rollers, and the housings fit into slots in the carrying stands. Return idlers are conventional steel units secured to steel frames, and are installed on 15-ft centers. Training idlers are placed on 50-ft centers.

After the continuous miner and belt have advanced 50 ft, a continuously burning indicator light on the tail section goes out, warning the operator that the conveyor is fully extended. A 2-man crew adds a 100-ft section of belt in 3½ min. A spool of belt always is kept in place on a stand that straddles the conveyor at the drive section. The spool rests on two rollers and the new section is spliced to the belt on the conveyor after which it is unspooled onto the takeup cluster by the drive.

The 100-ft sections of the belt are wound on specially-designed steel spools stored in a belt-storage truck parked adjacent to the conveyor. The truck is equipped with a monorail and 1-ton Budgit hoist for easy handling of spools. Sections of belt are joined with Heyden splices. Retrieving the sections is handled with a built-in power winder at the rear of the driver section. With this unit, two men removed 1,200 ft of belt in 65 min, including placing it on the storage truck.

POWERING THE INSTALLATION

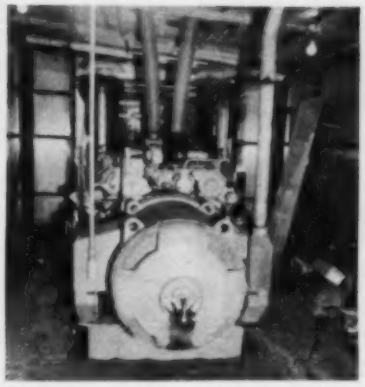
A 300-kw General Motors twin-diesel generator with automatic voltage controls supplies 440-v AC power to the continuous miner and extensible belt. The substation and generator controls were supplied by the Highway Equipment Co., Pittsburgh, while the switch panel was built by the Lake Shore Electric Co., Bedford, Ohio.

A 3-conductor 4/0 rubber-covered

SCENE OF OPERATIONS is 12 mi north of Kittanning, Pa., in an area previously strip-mined to a 50-ft highwall.

RUBBER-MOUNTED elevating conveyor with adjustable boom transfers coal to 12-ton trucks.

COMMUNICATION between face and outside is provided by phones on belt.



POWER GENERATOR is 300-kw diesel in wheeled metal building.

COMPANY-DESIGNED power-cable guide prevents damage to cables.

cable carries power to the continuous miner, and a 9-conductor unit carries power and control wires for the extensible belt. In the latter cable, three conductors carry power to the tail section; two operate the indicator light; one controls the start-stop safety switch; and one serves as a common ground for the miner and belt.

Ground wires in the 9-conductor cable are connected to a 300-ft section of No. 2 cable, which has pieces of sheet metal attached at 100-ft intervals and is buried at the edge of the spoil bank. The 30-in transfer belt connecting the Colmol to the extensible conveyor is driven by a 5-hp motor receiving power from the tail section of the belt. All pumps and auxiliary equipment are equipped with 460-v motors receiving power through 4-conductor cables. The lighting system operates on 220 v.

Ventilation at the working face is provided by a portable Joy fan installed at the mouth of the room being mined. A 3x1½ Murray reciprocating pump connected to a 2-in Carlon plastic pipe line is used to dewater the working face. A high-pressure John Bean reciprocating pump circulates water in a closed circuit to cool the hydraulic oil of the Colmol.

Compressed air carried to the face through a hose is used to blow dust away from the mining area. An Ingersoll-Rand unit handles the compressing job.

Power, water and air lines are clamped to a ⅛-in wire rope at 50-ft intervals to prevent straining the cables as the miner advances. Vertical and horizontal rollers installed at the mouth of the room prevent abrasion of the cables and hoses as they are pulled forward. The company also has designed and built a special vertical roller which can be installed easily to guide the cables and hoses in the room.

FUTURE PLANS

Already enthused with the results of the continuous miner and extensible belt, Mech Mining management is looking forward to even better performance in the future. To improve efficiency and increase the flexibility of the operation, the following changes are planned:

1. The continuous miner and elevating conveyor will be used to neck 10 rooms to a depth of 25 ft. This will permit the equipment to work in a narrower pit and will facilitate setting of sights. As a room is completed, the continuous miner will be able to move underground immediately in a necked room and the tail section of the belt will be at the highwall.

2. An electric drive with clutch will be added to the elevating conveyor, permitting the gasoline unit to be used for tramming.

3. A Baker tractor is being remodeled to handle supplies. The unit will be battery-powered by a 48-v Exide battery and will have a built-in m-g charger unit and Budgit hoist. It also will have a 4-ft platform extension for carrying belt idlers, oil and timbers.

4. A canvas belt with slide buckle will be used to hold the belt securely on the spool.

5. Troughing idlers will be placed on 6-ft centers and return idlers will be installed on 12-ft centers. Thus 20% fewer troughing idlers will be needed and installation time per foot of conveyor will be decreased.

ELECTRIC SHOVEL with 20-yd dipper usually follows contours of gently rolling Oklahoma terrain.

VARYING TOUGHNESS of overburden determines amount of drilling and quantity of explosive used.

LIGHT TRACTOR tows drill rig around pit. Drill-rig chassis was built in Sequoyah mine shop.

PIT HUMS as twin pinners, twin loading machines, tractor-trailer units and a road sprinkler combine for efficient mining in Oklahoma strip pit. Principal product is metallurgical coal.

DEEP-MINE LOADER in Sequoyah open pit throws 100 tph into 25-ton tractor-trailer haulage units.

Deep-Mine Loaders in Open Pit

Stripping at Sequoyah mine is marked by . . .

High efficiency with unconventional equipment

Flexible methods for handling overburden

Economy with salvage of loose coal and fireclay

TWO UNDERGROUND-TYPE MOBILE LOADERS and a tractor-mounted high-lift machine with a 4-yd dipper make up the loading equipment at the Sequoyah strip mine, Rogers County Coal Corp., Claremore, Okla., an affiliate of Sinclair Coal Co., Kansas City, Mo.

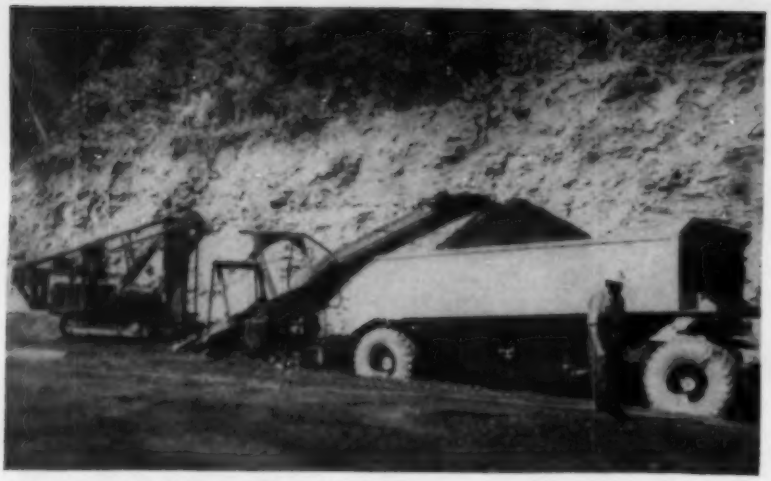
The Sequoyah mine, located about 6 mi north of Claremore, Okla., on U. S. Highway 66, employs about 60 men and produces from 1,200 to 1,600 tpd from the 18-in Sequoyah seam. Coal mined near the outcrop makes an altogether satisfactory fuel for cement mills, to which it is shipped on contract. The mine also produces a first-rate domestic stoker coal. When mined from beneath adequate cover, the product is a top-quality metallurgical coal containing only 0.75% sulphur and coking into a No. 6 button.

The mine has a well equipped laboratory that works in conjunction with steel customers. Each loaded car at the tipple is sampled for ash and sulphur content and free-swelling index of the coal. Most of the coal produced is shipped to Lone Star Steel Co., Lone Star, Tex., and Sheffield Steel Div., Armco Steel Corp., Houston, Tex.

Underlying the Sequoyah seam is 5 ft of fine-quality fireclay. Missing no opportunity to turn an honest dollar, the company disposes of the fireclay to a nearby brick manufacturer, who scoops it out of the pit after the coal has been removed and uses it to make a handsome buff-colored brick. The small quantities of loose coal left in the pit are handloaded by independent truckers, who haul it to the company's scales and then to the hopper to be loaded for shipment.

Removing the Overburden

Overburden ranges from 9 ft at the outcrop to the stripping limit of about 50 ft. In the deeper areas, blue shale in the overburden runs to as much as



PINNING MACHINE, working ahead of loading machine, breaks 18-in coal with a 4,000-lb weight to ease loaders' job.

HIGH-LIFT LOADER, which usually works alongside mobile loaders in pit, here hoists trailer with broken axle.

LIGHT MULTIPURPOSE TRACTOR, one of a pair, cleans top of coal, piles coal for loading and does other yeoman jobs.

30 ft, with some 5 ft of sandrock lying above the shale.

A Hardsocg horizontal highwall drill powered by a Wisconsin gasoline engine drills 6-in holes 65 to 80 ft into the highwall on 25- to 30-ft centers about 3 ft above the coal. Holes are sloped to follow the pitch of the seam, which averages about 2 deg downward in a westerly direction. The drill is mounted on a shop-built chassis and can be elevated and leveled by means of wire ropes over a system of sheaves and pawl-and-ratchet drums, hand-operated. The drill is pulled from one spot to the next by a Caterpillar D-2 equipped with a 'dozer blade.

Explosives used are Apex, Illinois and du Pont, with Primacord. In heavy rock cover, 5-in powder is used; in lighter cover, 3- to 4-in powder. Holes are loaded with from 200 to 400 lb of explosive, depending upon how tough the cover is.

Uncovering and Pinning Coal

The stripping unit is a Bucyrus 750-B electric shovel with a 20-yd dipper. Stripping generally follows the contour lines of the gently rolling terrain. After the overburden has been removed, the top of the exposed coal is cleaned by the D-2 bulldozer, mentioned above, and its twin, another D-2. The coal is broken for easy loading by twin pinning machines carrying 4,000-lb weights and mounted on Caterpillar D-4's. The pinning machines operate immediately in front of the loading machines.

Water in the pit poses no real problem. With contour stripping, most of the coal is above drainage except for the west end of the pit. For the western areas and for emergencies in other parts of the pit, the company keeps an assortment of 3- to 6-in pumps, some gasoline driven, others electric-drive.

Loading With Light Units

Two Joy 11-BU underground-type loading machines mounted on crawlers do the lion's share of loading coal into tractor-trailer haulage units for the 3-mi run to the tipple. The 11-BU's have been modified by extending the boom to 20 ft in length, eliminating the horizontal swing and erecting a steel framework, with hydraulic pistons and wire rope, to raise and lower the boom. Usually, to load coal into the trucks that back up beneath it, the height of the boom at the discharge end is about 14 ft.

Controls for the 11-BU's are in the usual place—that is, on the right-hand side of the machine, so that the operator has a full view of the gathering

arms. The power cable, brought in over the highwall and trailing behind the loading machine, is suspended at the machine from a short boom above and in front of the operator. With one of the twin D-2's pushing loose coal into piles alongside the swath of coal being loaded, the 11-BU's handle about 100 tph each.

When not busy building roads, rescuing a truck in trouble (see one of the accompanying photographs) or doing other miscellaneous jobs, a diesel-powered Athey Mobiloader mounted on a Caterpillar D-8 tractor loads coal, working alongside the 11-BU's. The Athey machine, with its 4-yd dipper, is especially useful for loading coal in those scattered places where the seam dips or buckles sharply and the 11-BU's cannot work at top efficiency.

Power for pit and tipple operations comes over the highline from Grand River dam at 65,000 v. At the Sequoyah property voltage is stepped down to 13,200 and then to 4,160 for the stripping shovel and 440 for the 11-BU's and the tipple. The company uses skid-mounted Westinghouse substations—one for the shovel and two for the smaller pit units.

Hauling to the Tipple

Haulage units consist of two butane-burning Dart tractors and four International diesel tractors, all of which pull 25-ton semi-trailers. Tractors and trailers are serviced and repaired at the Sequoyah garage and shop. Haulage roads are built 45 ft wide on a natural base of sandy shale and clay with a topping of river gravel. Across the rolling terrain, roads are laid out to favor the load wherever possible.

At the tipple, served by the Frisco Ry., two McNally-Pittsburg double-roll crushers and one Tyler Ty-Rock vibrator, two Selectro vibrators and one United Iron Works screen are used to produce lump, nut and stoker coal and screenings. Tipple capacity is 2,000 tpd.

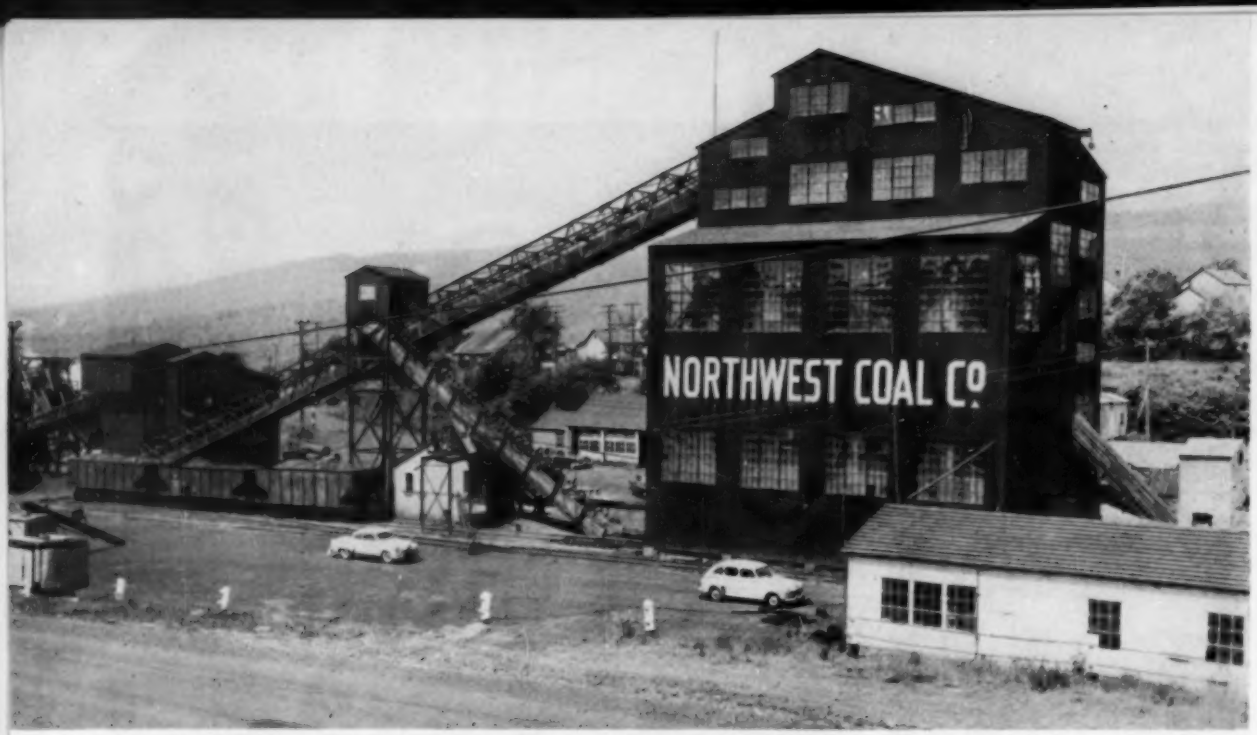
Stripped areas are seeded regularly with lespedeza, clover, rye and bermuda grass, all of which flourish on the upturned earth. In 1953, for the first time, a helicopter was used for seeding, laying down 100 lb of seed per minute in a 60-ft wide swath with each pass over the property.

Operating officials on the scene are as follows: Frank Podpechan, superintendent; William Podpechan, assistant superintendent; C. N. Webber, pit superintendent; F. D. Morgans, blasting foreman; Herman North, tipple foreman; Fred Melton, mine chemist, and Gene Blackburn, assistant.

GOOD HAULAGE ROADS, built for long life, lead across rolling terrain from pit to tipple, a distance of about 3 mi.

SEQUOYAH FIRE-BUILDERS—Frank Podpechan (left), superintendent, and William Podpechan, assistant superintendent, are veteran strippers.

PIT HUSTLERS—C. N. Webber (left), pit superintendent, and F. D. Morgans, blasting foreman, keep men and machines busy in the Sequoyah strip pit.



NORTHWEST COAL CO.'S trim cleaning plant is designed for long life with all heavy machinery in the rough-cleaning rollhouse at left. A 12-ft sand-type cone and three classifier cones clean all sizes in the stove through No. 5 size range.

Modernizing a Mine and Plant

A newer opening, providing better access to solid coal, and a well-planned cleaning plant, simplifying preparation, are big features of up-dating program at Raymond colliery, Northwest Coal Co., Carbondale, Pa.

JAMES MASCELLI (center), president, began his mining career 47 yr ago at this same colliery. His right-hand men are his two sons, Albert (right), vice president and general manager, and Fred, purchasing agent.

JUST ABOUT 47 YR AGO, James Mascelli, a young lad recently arrived from his native Italy, went to work at Raymond colliery, near Eynon, Pa., in the northern anthracite field. In the following years, Mr. Mascelli advanced through the ranks—driver, laborer, miner, contractor—at Raymond and other collieries until, in 1934, he formed his own organization, Northwest Coal Co., and purchased the Raymond property, a bright highlight in a heart-warming success story.

In the ensuing years, Mr. Mascelli has modernized the colliery through the addition of a new preparation plant and the opening of a new slope. The plant, primarily based upon the owner's designs, is equipped with a 12-ft Chance cone and three Menzies cones to produce all commercial sizes from stove to No. 5, inclusive. The new slope, No. 10, is located to permit more-efficient mining in solid areas of the Dunmore Nos. 2 and 3 and Clark veins.

Production now is from 600 to 700 tpd, clean coal, from a working force of 120 men, 68 underground at No. 10. About 60% of this tonnage is produced at Raymond mine, the remainder coming from another deep mine at Scranton, about 8 mi away, with

some from local strippings. Strip coal makes up not more than 10% of the feed to the plant. Northwest operations now are on a single-shift basis, although the plant is designed to produce 2,000 tpd when market conditions warrant this level of production.

CLEANING THE COAL

The steel-framed cleaning plant, erected in 1944, is designed for minimum vibration to control maintenance costs, and maximum preservation of the coarser sizes. About 50% of the product is in stove and nut sizes.

The plant consists of two units, a rough-cleaning and primary-crushing facility, and the main wet-washing and sizing plant. Housing the rough-cleaning units in a separate structure eliminates a major source of vibration from the main plant, since these units would be installed at the top of the cleaning circuit.

The flow through the plant is as follows:

Raw coal is dumped from either railroad cars or trucks into the main feed hopper constructed below ground level. The company owns 10 railroad cars, in which coal is transported from the Scranton workings, and five 15-ton International dump trucks, which haul coal from No. 10 slope. Reciprocating feeders transfer the raw coal from the feed hopper into the primary elevating conveyor.

The primary conveyor discharges onto a double-deck bull shaker in the rough-cleaning plant to make three splits, plus 5 in, 5x3¼ and minus 3¼ in. The 5x3¼ off the bottom deck of the bull shaker is fed into a similar set of rolls for reduction to minus 3¼ in, and the products of both crushers and the underproduct of the bull shaker are combined in the main elevating conveyor as washery feed. Primary crushing, therefore, produces egg-and-under.

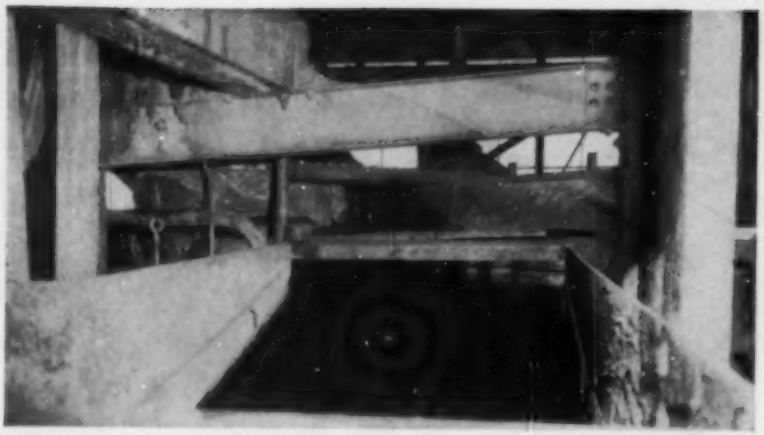
The main feed line discharges at the top of the main plant onto a 6-deck primary-sizing shaker. Raw egg coal from the top deck, 3¼x2$^{7}/_{16}$, is fed into another set of rolls to produce a minus 2$^{7}/_{16}$-in product which is fed into the Chance cone along with the overproducts of the next three lower decks; i.e., stove and nut, pea and buckwheat, and rice coal. Overproducts of the two lower decks provide barley and No. 4 feed for separate Menzies cones, and the underflow of the sizing shakers is sluiced to a settling tank which prepares feed for the third Menzies cone. The barley cone is a 4-ft unit and the other two are 3 ft in diameter.

SHAKING CONVEYORS AND SCRAPER LOADERS (below) are used in working 40-ft-wide rooms in the 30-in Dunmore Nos. 2 and 3 seams. A working force of 68 men underground at the company's new No. 10 slope produce about 350 tpd, or approximately 60% of total plant feed.

Clean coal from the Chance cone and the barley and No. 4 cones is sized on an 8-deck final sizing shaker. Coarser sizes are chuted into the pockets over spiral chutes to limit degradation. A single size from stove to No. 4 is separated on each deck, although the top deck again scalps any egg coal which may have passed the other units. This oversize is crushed to stove-and-under and is recirculated to the main feed line through the lip-screen pit and conveyor. Primary purpose of the lip-screen pit is to receive water and degradation fines from the final spraying as the clean coal is loaded out of the pockets into trucks or railroad cars.

Underflow of the final sizing shakers is sluiced into the sand cone, along with sand and spray water from the Chance-cone refuse screen.

The sand cone, an auxiliary of the Chance cone, provides a reservoir from which make-up sand for the cleaning unit may be taken and also serves to clean fines out of the sand.



CLEAN COAL, in the 2$^{7}/_{16}$x$^{3}/_{16}$-in size range, is discharged from 12-ft cone onto final-sizing shaker for separation into stove-through-rice fractions.

SPIRAL CHUTES gently lower larger sizes into clean-coal pockets to limit degradation as much as possible. The result is stricter sizing.

CAREFULLY-MAINTAINED shaking screens also prevent excessive degradation. Cone refuse is washed (right) to recover sand for main cleaning unit.

High-ash fines are automatically removed from the top of the sand cone by a pump which draws off this material through skimmer pipes when it reaches the level of the pipes. Cleaner sand, thus increased cone capacity, is one of the major benefits.

As mentioned, the No. 5 feed consists of the underflow of the primary sizing shakers. The material is passed over a riffle trough, dressed with 0.0223-in opening cloth, to remove high-ash fines ahead of the cleaner. The riffle product then is fed over a spreader plate into a baffled settling tank. The bottom conveyor of the tank raises the settled, deslimed solids and moves this material across a stainless-steel wedge-bar screen which also has 0.0223-in openings. The dewatered solids then are introduced into the No. 5 cone.

Clean No. 5 coal is discharged from the cone over a similar wedge-bar screen. All screens in the plant are furnished by Hendrick Mfg. Co.

SUPPLYING WASH WATER

Process water is pumped out of an inactive shaft adjacent to the cleaning plant by a 2-stage 10-in Hazleton centrifugal pump, capable of delivering 1,800 gpm against a 250-ft head. The raw water behind the underground dam is treated with a slurry of hydrated lime, prepared in and fed through a Savage chemical feeder on the surface. Frequent pH determinations are made to insure against highly-acid water entering the plant.

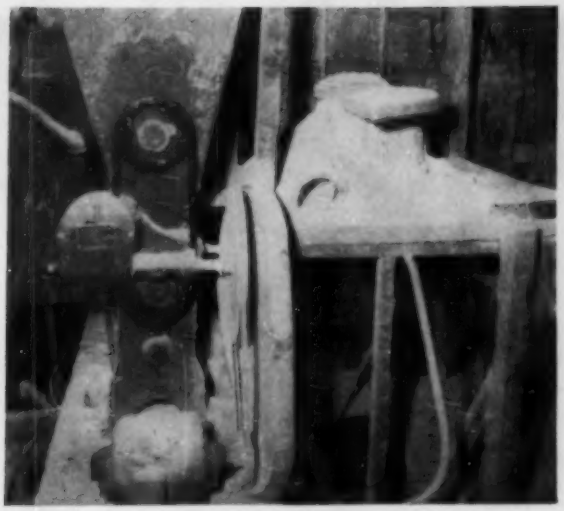
Recirculating water within the plant is collected in a settling tank. A 1,000-gpm pump returns water from the launder of this tank to the cleaning units as needed. Waste water from the plant is disposed of in old workings.

The washed Chance-cone refuse, and refuse from the Menzies cones, carried down in a 6-in pipe, is deposited on a 24-in belt conveyor for transportation to a refuse hopper. A refuse skip loads at this hopper and discharges to another at the top of the rock dump. A 15-ton truck equipped with an end-dump body hauls refuse from the top hopper to the limits of the dump.

The plant is operated by four men inside, each thoroughly trained in operating and maintaining the major units in the plant.

In pointing out the high proportion of prepared sizes in the product, Albert Mascelli, vice president and general manager, and son of the founder, explains that efficient screening as well as careful handling is necessary. Therefore, the alignment of shakers

CLASSIFIER CONES clean barley, No. 4 and No. 5 sizes. No. 5 feed and product go over wedge-wire screens.



CHEMICAL FEEDER prepares lime slurry and discharges it to underground process-water reservoir.

STEEL-BODY 3-TON MINE CARS are dumped into truck-loading hopper which feeds parallel chain conveyors for loading 15-ton trucks. This simple arrangement eliminates extensive haulage network between mine and plant.

is carefully checked at frequent intervals. Worn bearings, Mr. Mascelli says, may permit side motion of the screens, thus causing the coal to remain on the screens too long. The resultant contact of coal particles with each other and with the screen surface makes for excessive degradation. Furthermore, harmful vibrations are set up, which aggravate the condition. In-line screen action is important, Mr. Mascelli says.

MINING AT NO. 10 SLOPE

The Dunmore Nos. 2 and 3 veins vary in height from 20 to 36 in, with 30-in coal predominating. The Clark vein, above the Dunmore veins, has not been actively worked as yet. The measures are fairly level, but occasional rolls present mining complications and in some instances force abandonment of certain production and secondary-development openings. The roof generally is good, permitting the wide work necessary for reasonable production in thins veins.

Bottom rock is lifted in gangways to provide headroom for haulage, and both coal and rock in these openings is hand loaded. In the rooms, or chambers, either Vulcan shaking conveyors or Ingersoll-Rand double-drum scraper loaders are used. Rooms are 40 ft wide on 60-ft centers. The removal of the 20-ft-wide pillars depends upon the status of mining in the contiguous seams, since Northwest officials have committed themselves to a system of columinzation in order to preserve reasonable conditions in the two Dunmore veins and the Clark vein above. In the few areas where the contiguous seams have been previously mined, however, the practice is to immediately recover the pillars in retreating from the room. Northwest officials and miners have had considerable experience in "crushed-ground" mining in working older sections of the colliery.

Compressed air for drilling is provided by two portable Ingersoll-Rand compressors, a 50-B and a 90-B, and the coal is shot from the solid using permissible explosives and electric-delay igniters.

The 50-B compressor is underground and another 90-B, recently overhauled in the company's central shop at Carbondale, was installed underground during the recent miners' vacation. The 90-B originally operated on the surface now is being overhauled and will serve as a stand-by unit.

MINE SUPERVISORS—Oreste Paoletti (center), general superintendent, and Alfred Merolline, mine foreman. Chief Electrician Joseph Sparrow (right) is shown at controls of 200-kw converter, in surface substation.

Management . . . Northwest Coal Co.

Main Offices: Carbondale, Pa.

President: James Mascelli

Vice President and General Manager: Albert Mascelli

General Superintendent: Oreste Paoletti

Mine Foreman: Alfred Merolline

Preparation Foreman: John Casey

Chief Electrician: Joseph Sparrow

Shop Foreman: Joseph Kamin

Purchasing Agent: Fred Mascelli

Sales Manager: Carl Tomaine

Secretary: Theodore Luciani

WATER-LEVEL GANGWAYS provide access to Dunmore No. 3-vein workings at No. 10 slope which was started in late 1949 to develop solid areas.

Power for underground haulage is provided at 250 v, DC, by a 200-kw Westinghouse converter on the surface. A 150-kw Ridgway m-g set is a standby source of DC power. Other underground machines, including conveyors, scraper-loaders and compressors, are operated at 440 v, AC, from a surface substation. The company recently drilled a 4-in borehole to permit the installation of a power cable into the compressor room built for the 90-B.

Ventilating air is provided by a 6-ft Jeffrey Aerodyne pressure fan, moving 60,000 cfm.

The mine works a single shift per day, 5 days a week, and during summer operations some of this production must be stockpiled near the plant to fill increased demand during the busy seasons. A power shovel and portable conveyors are available for retrieving the stored coal from the stockpile. Such storage makes it possible for Northwest to fill orders on short notice and also serves to smooth out working time for the company's employees.

Service facilities maintained by the company include a well-equipped central shop at Carbondale where mine equipment is repaired. Armature winding, welding, machining and forging are done at the shop. The shop also serves as an equipment depot where overhauled machines and equipment may be stored until needed. Monorail hoists are available for removing heavy units from stock and placing them on the haulage units. Spare equipment, reconditioned after removal from worked-out properties, includes a fan, an air compressor, carhoists and other vital units.

two of a kind?

they *look* alike . . . but the
20# line takes the *heavy* loads

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Another important difference between Kennametal and ordinary tungsten carbides is this: Kennametal is made in grades, to provide maximum serviceability in various mining conditions. For example — Grade K12, with its exceptional shock-resistant ability, is used in cutter bits; roof drilling requires the extreme hardness and wear-resistance of Grade K9; while highly abrasive rock drilling calls for other grades.

Your Kennametal representative will gladly show you how the difference in carbides — and particularly the difference in Kennametal grades — can change production costs in *your mine.*

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KENNAMETAL*

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BEDFORD, PA.
General Offices and Main Plant at Latrobe, Pa.

FOREMEN'S FORUM

The Future Is Here!

Here's a look at how the World of Tomorrow develops, what Tomorrow's coal mine may be and what may then be demanded of supervisors. From here, it looks like a big order.

I CAN REMEMBER lying on the floor as a youngster, turning the pages of the magazine section of the Big-City Sunday newspaper and marveling at the World of the Future so often depicted in those magazine sections. The illustrations usually showed the city of New York as it would look after spired skyscrapers had been replaced by sleek-skinned buildings with very simple lines. Each would have its own roof-top landing area for strange flying machines. Multilevel highways would speed the flow of traffic. Tremendous bridges would vault the waterways. Even the ships in the Hudson River would have a different, faster look about them.

As we look out on New York today from this 29th floor of the McGraw-Hill building, we would like to tell you what we see. Directly below is the new Port Authority bus terminal. Buses from the west emerge from the Lincoln Tunnel, a modern marvel itself, and drive up a gracefully curved ramp into an upper level of the terminal, several blocks from the mouth of the tunnel. They never touch the city streets! Other ramps ascend to the roof of the building, where one of the largest midtown parking areas is maintained.

A few blocks farther south, we see helicopters landing and taking off from the heliport atop the headquarters of the New York Port Authority. The new United Nations building to the east, and others around here, look very much like the artists' conceptions in the old Sunday papers. The Triborough Bridge and the George Washington Bridge are in fact the tremendous structures the papers told us they would be.

The West Side Drive, the East River Drive and the new Brooklyn-Battery tunnel are the express arteries we were promised. The air is busy with trim planes, and the liner *United States* has the low fast look that ships of tomorrow are supposed to have.

The World of the Future is here. Or is it?

As we recall, the implications in those Sunday features would lead one to believe that when these physical changes had taken place all would be well with us. Everyone would have reason to be happy.

How come, then, in this shiny new world we still have tensions, frustrations, haggling and the blood-chilling picture of numbers of youngsters completely out of step with society. Not only in New York—we have been reading about Pachuco gangs in the U. S. Air Force.

What went wrong? Let's explore this question, but first let's make it plain that we are concerned, not pessimistic.

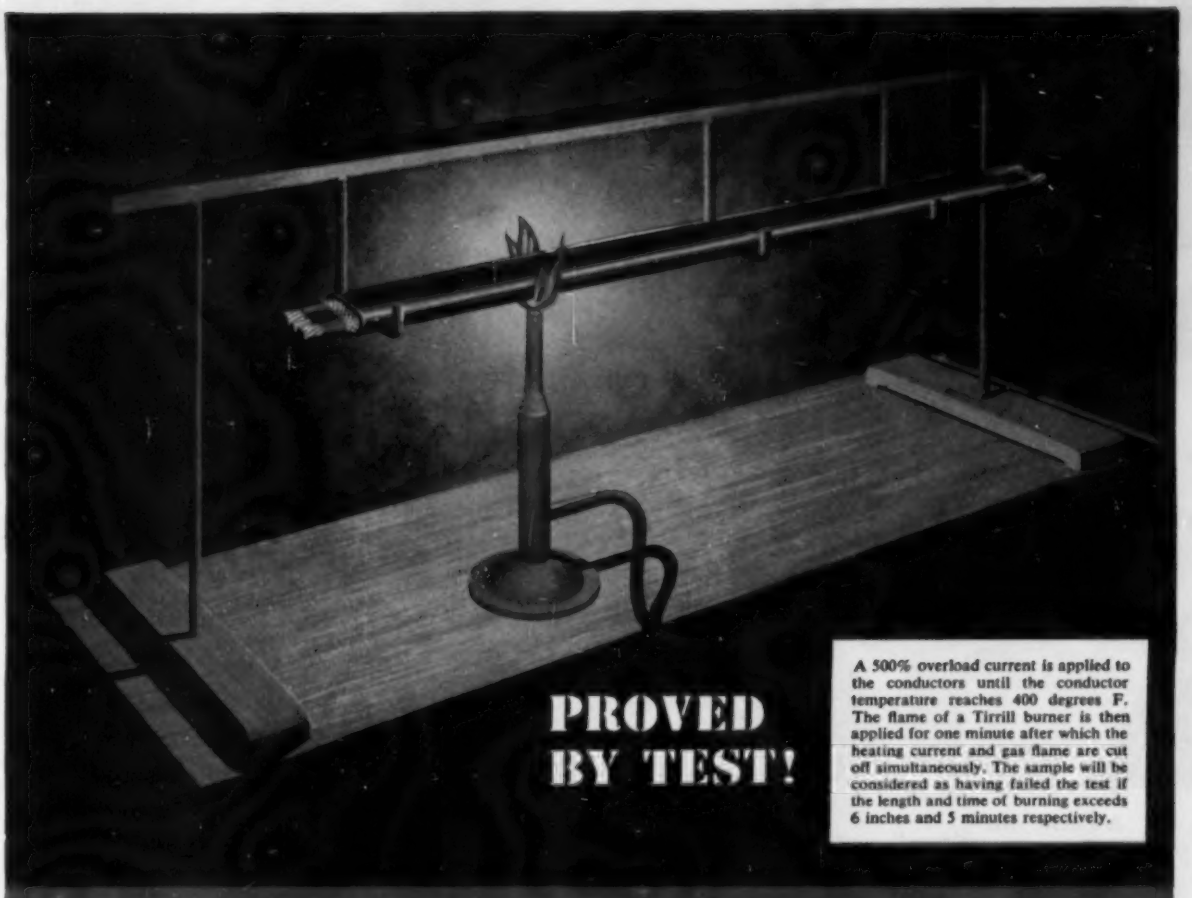
Perhaps we have not matched our emphasis on making things for the better life with equal emphasis on getting people ready to receive them and use them wisely.

Perhaps we have been so busy building an estate for our children that we have neglected to play catch or go fishing with them.

Have we expected too much from our schools in order to relieve the responsibility in our homes?

While our technology has been selfless, have our human relations been selfish?

We must keep in mind these four con-



PROVED BY TEST!

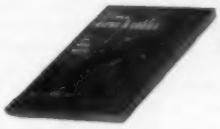
A 500% overload current is applied to the conductors until the conductor temperature reaches 400 degrees F. The flame of a Tirrill burner is then applied for one minute after which the heating current and gas flame are cut off simultaneously. The sample will be considered as having failed the test if the length and time of burning exceeds 6 inches and 5 minutes respectively.

Flame-Retardant

U. S. Royal Mine Trailing Cables

Ordinary coal mine trailing cables – when ignited by either mechanical injury or overload – will propagate flame and may carry the fire to other sections of the mine. *But not U. S. Royal Cables!* They are jacketed with a special flame-retardant 60% neoprene compound which also withstands cutting, chipping, abrasion, grease and oil. Performance grade rubber insulation is used up to 2000-volt service. Cables for over 2000-volt service are insulated with Uskorona-1 oil base insulation and have a semi-conducting tape over the conductors.

U. S. Royal gives "Service beyond price and specification" because United States Rubber Company is the only electrical wire and cable manufacturer to grow its own natural rubber, make its own synthetic rubber and plastics. Such control of the manufacturing process results in a *quality* product. Available in black, or gold for better visibility.



Write for free illustrated booklet, "U. S. Electrical Wires and Cables for the coal mining industry."

UNITED STATES RUBBER COMPANY
ELECTRICAL WIRE AND CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

US RUBBER

A LOOK AHEAD—Remote control by white-collared operators?

siderations as we lay the foundations for the next "future."

Getting back to our own bailiwick, let's look into the future of our industry and discuss some of the supervisory performances in human relationships that will help make that future a good one. You know, 1960, 1965 and 1975 are not really so far away, and these years are milestones in coal's future.

Right now, the picture looks like this. In 1975 we may produce more than twice as much coal as we produce today, and it may be done with little or no increase in the number of men in the industry. Expert technicians will man the machines that will make the necessary productivity a reality. And each of these technicians will be as vital as dragline and shovel operators are today in stripping. Each will have the capacity to make, break or slow down the whole process. You think you have problems now?

What kind of supervision will be required in mines like this?

First off, the supervisor will have to be capable of technical wizardry. The tools of his profession more than likely will include industrial television, remote control and maybe even underground pipeline transportation. It is conceivable that his men might report for work in white collars, figuratively speaking, to operate keyboards in dustproofed, air-conditioned control stations. (You can't subject delicate control panels to mine dust and humidity.)

He will have to understand fully the ground forces and stresses in coal's strata, and he may need a working knowledge of electronics and telecommunications of all kinds. He will spend much more time at a desk, and he, too, will wear a white collar. In all physical and technical aspects, this will be a wonderful job.

But will tomorrow's supervisor have a worried mind? (He may well be you if you are in your 30's.)

We suggest that he need not have a worried mind if he parallels his growth in technical proficiency with an equal growth in his understanding of human nature. On this score let's go back to the four considerations preceding this picture of tomorrow's coal mine.

On the first of these four points: How can one take steps to get people ready to receive and wisely use the better things in life?

It seems to us that the receiver, which means each of us at one time or another, must have a well-developed awareness of his own dignity. There is little dignity in a man with his hand out. But dignity is a human birthright endowed by Providence. Too often in this headlong rush to provide all good things for everybody, we may have stunted the growth of a sense of dignity in many who have not been made aware of this birthright of theirs. In a shower of gifts we suppose it is possible to fly in the face of economic truth, and to finally come to the place where one can sincerely believe that the world does owe everybody a living and that there is such a thing as a free lunch.

Purely and simply, then, getting people ready to receive and wisely use the good things in life means first of all telling them the economic facts of life—you get as you give, for example.

On the second point, it's risky to build an estate without making the prospective heirs aware of what is going into it in both tangibles and intangibles.

This awareness among the heirs is developed through the proper use of what has come to be known as public relations. Now public relations is a number of things. It is a function of top management, but it also is a function of front-line supervisors. Like it or not, you are in public relations for better or worse. If you can't sincerely support the aims of your company and industry, you are jeopardizing the good future, because your displeasure shows. On the other hand, if you thought long and hard before you accepted your supervisory job, you must be in agreement with the aspirations of your company and industry. So tell others, inside and out of the mine.

That is the best way to guide the heirs to this estate you are helping to build.

Take the third point, which is concerned with the source of education for tomorrow's world.

In your situation, you can't palm off the whole training chore onto the training department of your company, the Bureau of Mines or any other agency. You must help. In fact, their training efforts supplement yours, not vice versa, even as our schools can only bulwark the training our youngsters receive at home.

In the fourth point, we are not pointing a finger of accusation. We merely pose a question. Has our progress in making the most of our human resources kept pace with our amazing technological achievements?

Many people are beginning to wonder. More and more, you see references to developing a sense of belonging, to satisfying the human desires for respect and due credit for accomplishment and to keeping people informed of changes that will affect their way of life. These are important responsibilities of supervision; they are not corn.

You may well ask whether the supervisor 10 yr hence must be a nursemaid. Who knows? The supervisor is a number of things, perhaps even a nursemaid.

You may wonder why all these "fringe" considerations are so important. It is because less and less of a man's time is spent at work. In the past, a man's leisure was largely conditioned by his work, but we are fast coming to the time when his work may be conditioned by his leisure. We regret having raised this one, because it brings up a host of problems we are not prepared to tackle.

At any rate, there was much ado a few years ago about solving the problems arising from the monotony of mass production. We wonder if in the future hunting, fishing, golf and do-it-yourself will become monotonous because we shall have so much time for them. It's a legitimate subject for thought.

How soon should we begin to think about these matters which have such a profound bearing on our way of life? Well, we're not merely waiting for the Future to come to us—we started building it yesterday!

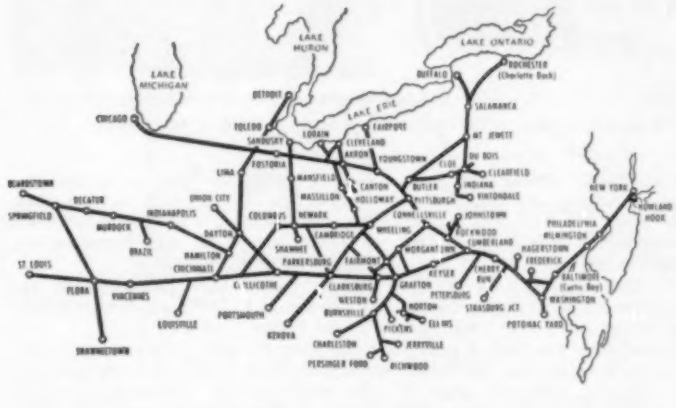
Your "burning question" is quickly answered—with

B&O Bituminous

Whether your specific question concerns power, coking, steam, or space heating, you'll find the perfect answer among the wide variety of Bituminous coals in Baltimore & Ohio territory. Here lies an almost inexhaustible source of low-cost heat and energy.

The benefits of B&O Bituminous are many. Highly mechanized mines keep production costs low, size and quality uniform. Closeness to America's industrial heart means economical transportation. The ease of storing coal eliminates the need for expensive facilities. And new methods and devices take further advantage of the burning characteristics of Bituminous.

ASK OUR MAN! He will help you find the exact coal for your purpose, and explain the best way to burn it. You'll be amazed at the efficiency, economy, and cleanliness of B&O Bituminous today.



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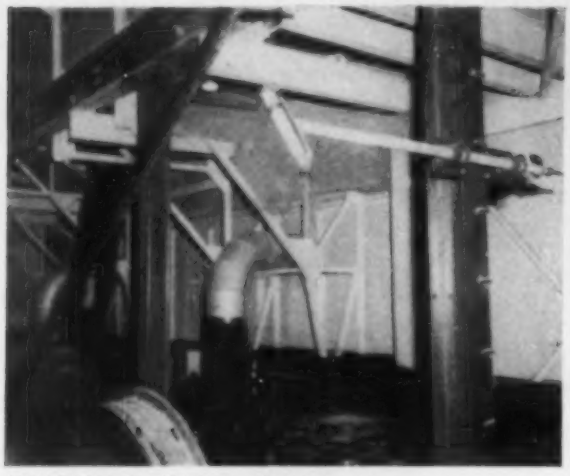
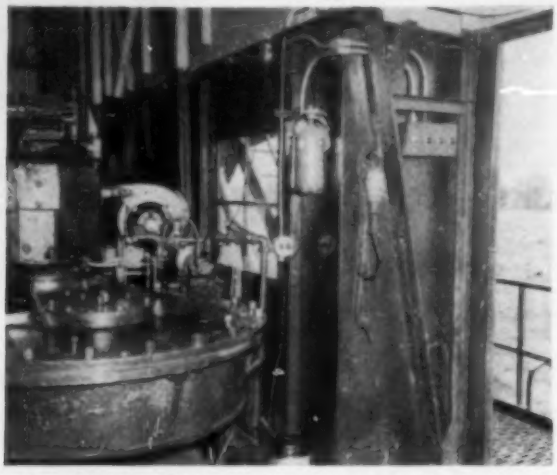
OPERATING IDEAS



HOIST-ROPE LIMIT is signaled when rope, advancing across drum on wind-in, shoves against T-rod.



FOUR-LIGHT SIGNAL PANEL (upper right) flashes red when any of four swing-motor oil pumps fails.

Adding Safeguards That Protect the Dragline

TENDER CARE is lavished on the big Bucyrus-Erie 1250-B walking dragline by the men of Crowe Coal Co., Clinton, Mo.

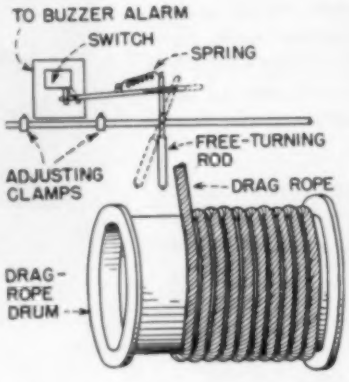
To protect the machine from inadvertence and carelessness, two devices recently have been added, as follows:

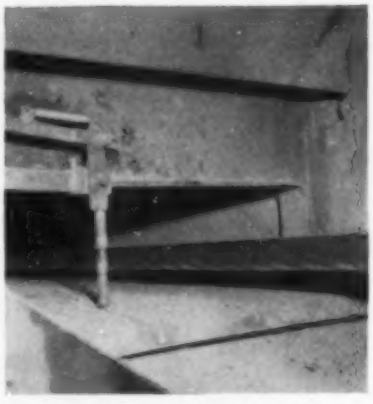
1. Two buzzer alarms that sound off in the operator's cab when the hoist and drag ropes are wound in as far as is safe.

2. A panel of electric lights that warn the oiler when any one of the four swing-unit oil pumps fails.

The machine operator is not always able to see where the bucket is and before the buzzer alarms were installed he sometimes hoisted or dragged the bucket too far and thus jammed the rope joints into the hoist or drag sheave. Now, the newly installed buzzers serve as the operator's eyes.

As shown in the accompanying photograph and diagram, the drag-rope protective device is a free-turning steel rod mounted near the rope drum at right angles to the rope. As the rope is wound in, it advances laterally across the drum, moving the distance of the rope diameter with each revolution of the drum. Eventually, as the winding-in continues to a predetermined point—that is, when the bucket is as close as is safe to the drag drum—the moving rope pushes against the steel rod. Pressure pivots the rod on a pin and thus pulls a steel shaft that closes a switch and sounds a buzzer in the cab. A spring brings the rod back into position when pressure is taken off. The position of the rod is adjustable by means of movable clamps, making it possible to change the point at which the buzzer sounds whenever the drag rope is shortened or lengthened.





DRAG ROPE, nearing limit of wind-in, pushes against free-turning rod and sounds buzzer that tells machine operator to stop drag motors.

A similar device, also shown in one of the accompanying photographs, sounds a warning buzzer when the hoist rope has been wound in to the limit of safety. It differs from the drag-rope device in that it is T-shaped, with the head of the T at right angles to the free rope and the shaft of the T enclosed in a steel pipe with a coil spring in the pipe to keep the T extended and to provide "give" when the rope presses against the head of the T. As the advancing hoist rope presses against the head of the T, the shaft slides farther into the enclosing pipe and thus closes a circuit that sounds the buzzer in the cab.

Both guards were designed and installed by A. F. Williams, chief electrician for Crowe Coal Co.

To keep the oiler informed about the oil pumps for the four swing units of the machine, Mr. Williams rigged a panel of four red lights at the oiler's station, as shown in the accompanying photograph. Failure of any of the four swing-motor oil pumps closes a diaphragm switch which, in turn, flashes a red light on the panel.

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You miss the BIG savings of Correct Lubrication when you set your sights on price alone!

SOCONY-VACUUM

SOCONY-VACUUM

Correct Lubrication

First Step in Cutting Costs

If you're aiming at lower costs in your plant, you won't automatically bag a bargain by buying low-priced oil and grease. Fact is, the few pennies you save on initial cost may prove mighty expensive.

The productive efficiency of your machines—how long they last—cost of maintenance...all this literally may rest on just a thin film of oil. You can't take chances with this vital film—you need *Socony-Vacuum* quality!

But this top quality is only part of the Socony-Vacuum story. We also work with your plant personnel to analyze your machines, recommend the right products, set up lubrication schedules, give you progress reports on benefits achieved.

In thousands of plants such a program of Correct Lubrication has improved production—significantly cut unit costs. Can you afford to accept anything less?

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

BELT CONVEYOR extending up the hill to left handles wet refuse as a part of a new installation that has cut refuse disposal cost in half. Discharge end of present refuse-conveyor system (right), where bulldozer and pan are teamed together.

Improved Refuse Disposal Halves Handling Costs

ADDING A REFUSE BELT extending up the hillside from the plant and purchasing a pan to distribute and pack the material has cut the cost of handling refuse in half at the No. 1 preparation plant of the Amherst Coal Co., Amherstdale, Logan County, W. Va. Two man-shifts and the maintenance of two trucks have been eliminated.

Plant reject, in turning out 4,000 tons of clean coal per 2-shift day, consists of 1,100 tons of 5x0 wet refuse and 225 tons of plus 5-in dry refuse. Originally, the wet refuse was deposited in a 300-ton concrete silo and the dry refuse in a 50-ton steel bin, both adjacent to the plant. Both types of refuse were hauled away by trucks and, at best, the job kept three trucks busy. The haul was up a 9% grade into an adjacent hollow and the length of haul, one way, was between 1,500 and 2,500 ft. In addition to the three trucks employed, a 17-ton Euclid, and two 14-ton International KB304 units, an International TD-18 bulldozer worked one shift per day grading and packing the refuse.

Since the wet-refuse bin is located on the side of the tipple adjacent to the base of the hill and the refuse is small enough in size for economical belt transportation, a belt was considered as a solution to the problem. It was determined that a 36-in belt 320 ft long on a 15% grade and a belt of the same width 500 ft long on a 5% grade would convey the wet refuse up to a point from which the bulldozer could distribute it for several years to come. The installation would eliminate the use of two trucks and attendant maintenance, as well as cutting off the drivers.

Freezing of wet refuse in severe weather also was a factor considered. Normally, this would occur not more than 2 to 4 days during a winter, but it was decided to continue to provide for optional discharge of the refuse into the bin and optional transportation by trucks. The project, using Barber-Greene conveyors, was installed with the original complement of trucks kept in reserve for extreme cold weather.

The TD-18 bulldozer had to be worked long hours to move the wet refuse brought up by the belt conveyor and handle the leveling and grading for the Euclid truck which continues to haul the coarse dry refuse. While coal company officials knew of no case where pans have been used regularly to pile refuse, they thought this offered a good possibility for saving more money and rented a pan as a trial for several months. The unit proved effective and as a result they recently purchased and installed a new 9-yd International pan for regular use with the International TD-18 bulldozer.

The new pan moves about three times as much refuse per trip as did the bulldozer blade. With the longer hauls, the extra speed provides a further advantage, so that the two units together move more than three times the material the bulldozer did alone.

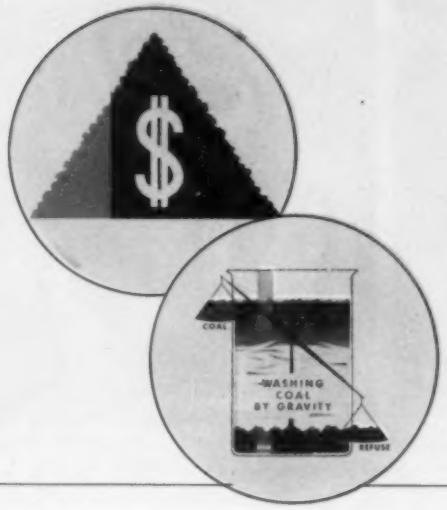
Portable Table Makes Truck Maintenance Easier

A PORTABLE WORK TABLE mounted on steel casters provides a platform from which maintenance work can be carried forward more safely and efficiently on the 300-hp Cummins engines of the Euclid tractors used in coal-haulage service at the Colonial Mine of The Colonial Coal Mining Co., Madisonville, Ky. The table, designed by Glen Angle, truck mechanic, is constructed of pipe and angle iron and is provided with a guard rail and steps for convenience and safety.

In addition to the large work area, the platform also provides plenty of space for tools and engine parts. It is particularly handy when changing engine heads. When in use, it is secured to the truck by means of wire cable. Being light in weight, it can easily be moved from one truck to another or moved out of the way after the work has been completed.

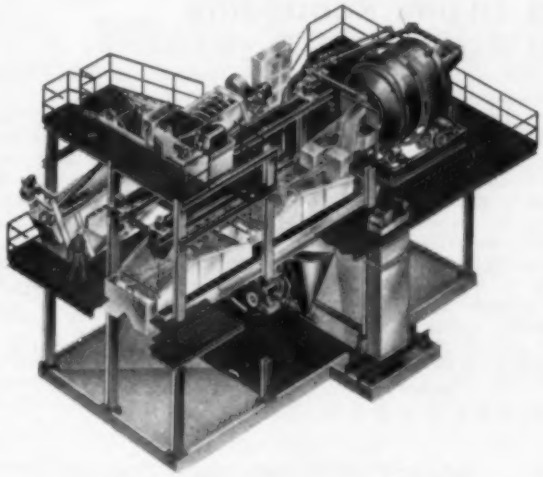
PORTABLE WORK TABLE for maintenance of haulage units provides seat for Glen Angle, who designed it. G. W. Hudson, shop foreman, stands by.

CONTROLLED CLEANING produces COAL PROFITS



Profitable coal cleaning in today's market requires control of washing operations with low cost, efficient methods.

The newest, most efficient coal cleaning method for most operations is Heavy-Media Separation with WEMCO MOBIL-MILLS.



You have a choice of three types of Mobil-Mills in selecting a washing plant to fit your particular requirements:

1. **DRUM TYPE MOBIL-MILL** for accurately controlled washing of a full range of sizes from 8" to ¼" with capacities up to 420 TPH.
2. **DOUBLE DRUM TYPE MOBIL-MILL** for efficient cleaning of coal having complicated middling and washing characteristics. Produces a high quality float coal, a carefully controlled float middling and a reject. Capacities dependent on individual problem.
3. **CONE TYPE MOBIL-MILL** for efficient, large volume production of fine coal in sizes 4" to 3/32", with capacities up to 420 TPH.

Prime advantages of WEMCO MOBIL-MILLS for coal cleaning are:

Efficiency of cleaning
Accurate control of operations
Low investment per TPH of washed coal
Low operating and maintenance costs

Call a WEMCO engineer today for complete information on WEMCO test facilities to solve your coal cleaning problems, or write for descriptive bulletin.

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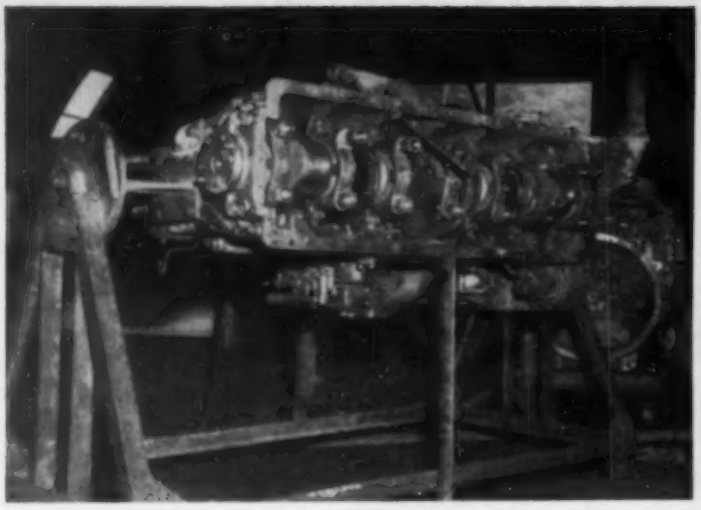
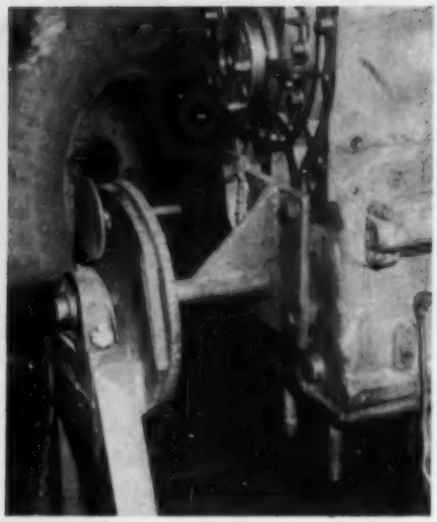




ENGINE REBUILD STAND holds big diesel power plant in side position for repair. Side brace provides safety for mechanics. Locking discs and pin (right) hold engine securely in place in any position.

Shop-Built Stand Eases Engine Rebuilding

AN ENGINE REBUILD STAND designed by Glen Angle, mechanic, The Colonial Coal Mining Co., Madisonville, Ky., has boosted shop efficiency and safety in the maintenance of haulage-truck engines through ease of handling and better accessibility.

The stand consists of two A-frames built of angle iron, which are welded to an angle-iron frame equipped with steel casters. The engine is suspended between two shafts supported by pillow-block bearings mounted at the top of each A-frame and is held in place by being bolted to steel plates welded to the end of each shaft. The plates are drilled to match the bolt holes in each end of the engine.

A steel plate disc is welded to the A-frame at one end and a similar disc, parallel to the stationary disc, is welded to the shaft. Identical holes drilled in the two discs make it possible to lock the engine in any position by means of a locking pin inserted through the two discs. When the engine is on the side position, a vertical brace is bolted to it as a safety precaution.

With the stand the engine may be easily adjusted to a side position for the insertion of cylinders; upside-down for the replacement of the crankshaft; or right-side up for inserting cylinder liners.

At the present time, the position of the engine is adjusted by means of a hoist but it is planned to improve the stand by installing a worm gear that will make it possible to adjust the engine to any position by hand.

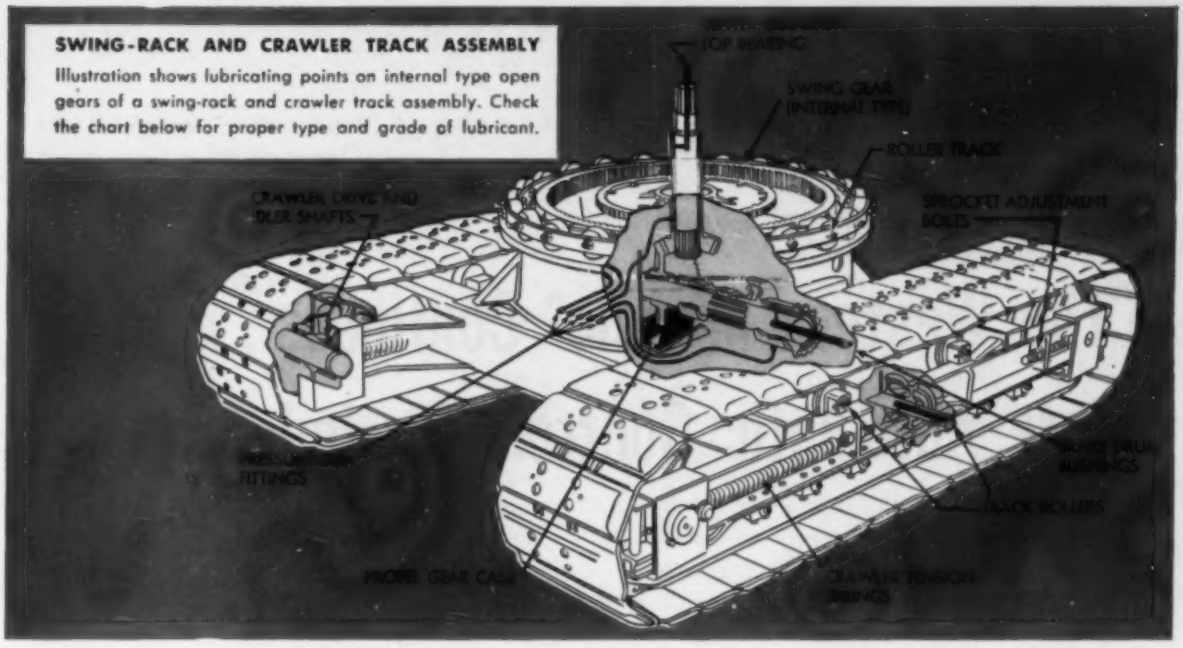
Hot-Oil Bath for Parts Speeds Machine-Shop Jobs

AN OIL BATH that heats and thus expands pinions, bearings and other machine parts that require tight mounting on shafts now is in service at the shop of Crowe Coal Co., Clinton, Mo.

The hot-oil bath, joint project of R. H. Bradley (left, in photo), master mechanic, and A. F. Williams (right), chief electrician, consists of several gallons of ordinary lubricating oil; an outer drum of 16-gage welded steel 32 in in diameter; a 2-in layer of Fiberglass insulation between the outer and inner drums; an inner drum of 16-gage welded steel 28 in in diameter; a Calrod-type electrical heating unit, 220 v; and a thermostatic control that maintains oil temperature at 350 F, some 50 deg below the flash point of the oil. After use, oil can be drained off through a petcock.

A pinion, a bearing or any other close-fitting part is immersed in the oil bath, the heating unit is turned on and, as the oil heats up, the part expands. When heated sufficiently, the part is hoisted out mechanically and slipped onto the shaft, where it cools, contracts and seals itself securely in place.

A similar oil bath, smaller in size, is used for light, small parts.


SWING-RACK AND CRAWLER TRACK ASSEMBLY
Illustration shows lubricating points on internal type open gears of a swing-rack and crawler track assembly. Check the chart below for proper type and grade of lubricant.
TOP BEARING
SWING GEAR (INTERNAL TYPE)
ROLLER TRACK
SPROCKET ADJUSTMENT BOLTS
CRAWLER DRIVE AND IDLER SHAFTS
TRACK ROLLERS

Where, how and with what to lubricate?

Lubricating procedures and suggested materials discussed on this page represent just one of the many invaluable sections contained in the newest Cities Service EARTH MOVING AND CONSTRUCTION MACHINERY LUBRICATION BOOK. For your FREE copy, write Cities Service Oil Company, Sixty Wall Tower, New York City 5.

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LUBRICATION OF SWING-RACK AND CRAWLER MECHANISM

Part or Unit	How Lubricated	Lubricant Recommended	Grade No. 0°F. to 32°F.	Grade No. Above 32°F.
CRAWLER MECHANISM— Track rollers, idlers, track wheels, etc.				
Oliver:	Track Wheel System	Trojan Gear Oil	#90	#140
Allis-Chalmers:	Positive Seal Units	Trojan Grease	P-0	P-0
Others—				
Grease Lubricated:	Pressure gun fittings	Trojan Grease	A-0	A-1
	Pressure gun fittings	Trojan Grease	F-3-0	F-2-0
Oil Lubricated:	Hand gun or other means	Trojan Gear Oil	#90	#90 to #250
GEAR DRIVES—				
Open: Normal Condition	By brush or other means	Cisco Compound	#3-Z	#5-Z
Dusty Condition	By brush or bath	Raven Oil	#3	#7
Enclosed:	Bath	Trojan Gear Oil	#90	#140

RESULTS OF AN INTELLECTUAL REVOLUTION . . .

"The Western Miracle" Continues . . . More Automatic Controls for Industry

Within recent weeks three new monthly technical magazines devoted to automatic control systems for industrial processes and machinery have offered the public their first issues. One of these is CONTROL ENGINEERING, a McGraw-Hill publication.

What has caused this surge of interest in the design and application of automatic control systems? What does it portend for the future of American industry? More important, what does it promise for the American standard of living, of which industry is and must be the servant? And what is the role of CONTROL ENGINEERING in this development? It is to those questions that this statement is addressed.

A New Intellectual Revolution

It is frequently asserted that we are now in the throes of a new industrial revolution. The revolution is described as the eliminating of wasteful applications of human labor to repetitive tasks through new technology which makes it possible to transfer those tasks to automatically controlled machinery.

It is perhaps more accurate, however, to say that we are the beneficiaries of a new intellectual revolution in the application of science to industry. This new intellectual revolution points the way toward giant strides in the continuing process of taking dull and laborious work off the backs and minds of men and transferring it to machines operating in large batteries under automatic control.

The practical engineering work required to convert this intellectual revolution into a full-scale industrial revolution, however, in large part still remains to be done. It is to this task that CONTROL ENGINEERING will be devoted. Its role is that of bridging the gap, in engineering and economic terms, between the new conceptions of automatic control of industrial processes and their practical workaday application. These conceptions run the full gamut from systems of control for automatic factories making heavy industrial products to highly personalized systems of automatic control to warn people when they are approaching the broiling point in sunning themselves at the beach or becoming too drowsy to drive their cars safely.

Enter the "Feed-Back" System

Enough work has been done to move these conceptions out of the realm of interesting dreams and into the realm of practical possibilities, and in some cases into the realm of practical realities. Crucial parts of this work were done during World War II when weapons were successfully equipped with "feed-back" systems

that automatically corrected mistakes made by the weapons in locating their targets.

The principle of the "feed-back" system is as ancient as the personal monitor that tells us not to run into each other as we walk along the street. It feeds back to our locomotion machinery the warning of a collision ahead. But the application of the principle to weapon control and then to more general machinery control required superlatively imaginative and skillful scientific development.

When a "feed-back" system that monitors an automatic process and keeps it lined up precisely is teamed up with a computing machine, capable of making lightning calculations that control both what goes into the process and what is done with the product, the horizons of automatic control become broad indeed. But in large part they still remain horizons. A vast range of practical engineering work remains to be done to realize anything like the full potential of automatic control of industrial processes and machinery.

More and Better Jobs

There are those who view the surge of interest in automatic control with alarm. They conjure up a situation in which automatic processes will at once expand the ranks of the unemployed and reduce many of those still working in industry to the status of robots or automatons.

A look at the record of the American economy — a record of amazing growth, steadily improving job opportunities and a constantly rising standard of living — demolishes the basis for such fears. The introduction of new and more efficient industrial machinery and processes obviously cannot be accomplished without creating some disturbance for some individuals and some companies. But consistently the longer range effect of such local and temporary disturbance has been more jobs and better jobs for Americans.

It is no accident that, while the proportion of industrial wage earners in our population is virtually the same as it was in 1920, the proportion of professional and salaried workers has doubled. The proportion of unskilled workers, furthermore, has dropped by half. This has been an essential part of a continuing process by which drudgery has been transferred to machines while the workers who formerly did the drudgery have been graduated to jobs calling for greater competence and providing better pay.

Higher Living Standard

A British historian, H. J. Hancock, has referred to this general process as "the Western miracle" — that of providing an ever higher and higher standard of living for more and more Americans. The key element in this miracle has been more and more reliance on power-driven machines to get the day's work done.

In the nature of the extremely complicated apparatus involved, full development of systems which have passed through the "think stage" into the status of practical possibilities will be a time-consuming process. It will also be a very exacting process, calling for a tremendous application of engineering skill and ingenuity. However, the engineers who are concentrating on this difficult, workaday phase of the development of apparatus for automatic control will be inspired by the knowledge that they are making a crucial contribution to technical progress which holds great promise of good for the American people.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

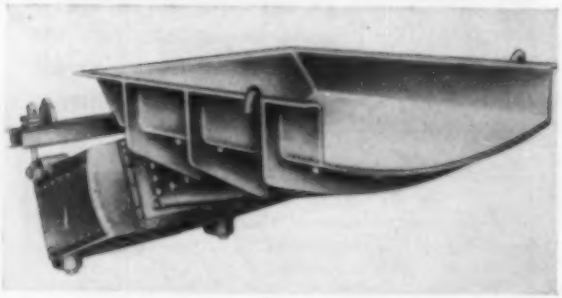
EQUIPMENT NEWS

Versatile Track Cleaner Loads up to 10 Yd a Minute (1)

Track cleanup in tipple and hauling areas can be put on a steady production basis with its new off-track, self-propelled 125 HiLoader track cleaner which can load up to 10 cu yd of loose debris from track areas a minute, according to the Athey Products Corp., Chicago 38. Operated by one man, the unit is powered by a 101-hp engine and has a cutting edge extending 98 in across the front of the loader, with tunnels to protect the track and guide the machine. The tunnels can be removed for other work assignments, and the unit can be used to load coal from stockpiles and for other jobs. A 15-ft 7-in high discharge conveyor swiveling 55 deg to either side casts the material into trucks or rail cars. The 125 HiLoader loads at speeds up to 2 mph, can move off-track at speeds up to 20 mph, and uses big tires that permit work across tracks without damage to roadbed or machine. Circle 1 on the postage-free card facing p 132 for full data from Athey Products.

FOR A CONVENIENT CHECKLIST, tear out the postage-free card facing p 132 now. Then as you go through this section, circle the numbers of the items that interest you, fill out the card and mail. Manufacturers will be glad to send you literature listed or more information on new products, without obligation.

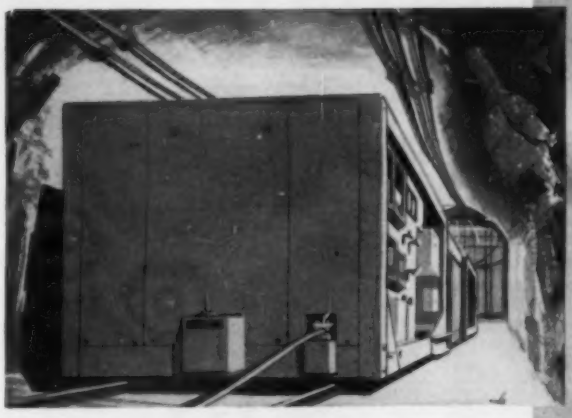
Heavy Duty Feeder Offers Large Capacity (2)



New Model F-86 heavy-tonnage vibratory feeder, the largest of its complete line, has been announced by Syntron Co., Homer City, Pa. Equipped with 54 x 72-in flat pan trough, the F-86 has a maximum feeding capacity of 750 tph of bulk materials. It utilizes the patented Syntron electromagnetic principle that eliminates such rotating parts as gear, belts, idlers, eccentrics, etc., and produces 3,600 conveying vibrations per minute from 220 or 440 v, 60-cycle AC. The rate of material flow from the feeder is regulated over a wide range by a dial switch in a separate control box, and the feeder can be equipped with multiple driving magnets in dual or twin series to provide greater tonnage and a wider stream of material, the company reports. Catalog data from Syntron.

New Lightweight ¾-Yd Shovel-Crane (3)

A new light ¾-yd Model LS-68 shovel-crane, announced by Link-Belt Speeder Corp., Cedar Rapids, Iowa, to replace its Model LS-52, offers all advanced features, including Speed-o-Matic power hydraulic controls, together with several notable advancements, the company reports. Among the important features cited are a heavy, wide lower frame designed to permit use of 24- or 30-in shoes; large, 10-in-diameter heat-treated forged-steel single-flange track rollers, bronze-bushed and mounted on 2½-in-diameter shafts; cast-iron clutch shells for superior friction action and longer life; and a weight of 35,300 lb as a standard shovel. Bulletin 2451 from the company.



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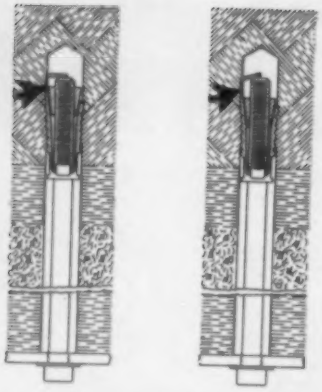


NEW-TYPE ROOF BOLTS (4)

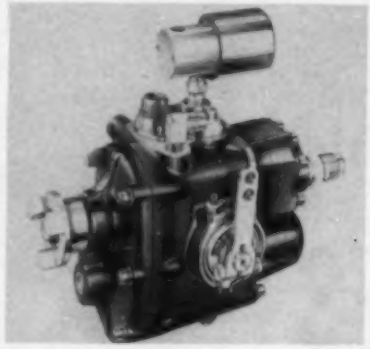
Expansion-type roof bolt announced by the West Virginia Steel & Mfg. Co., Huntington 6, W. Va., features a new "finger-type" expansion sleeve that eliminates the need for ears or special nuts on the bolt to secure initial anchorage, the company reports. Because of the design of the expansion sleeve and its one-piece construction springs, bands or extra parts are not needed. The bolts are available in diameters of either ⅝ or ¾ in, with a minimum breaking strength of 20,000 lb, and can be shipped with expansion shell assembled on the bolt. Action of the restraining finger (arrows) as bolt is tightened is shown in drawing. Bulletin with full details from company.

SHUTTLE-CAR WHEEL UNIT CUTS REPAIR COSTS (5)

The Lee-Norse "Drive Wheel Friction" unit is designed to reduce high maintenance costs on 5-SC and 6-SC shuttle cars resulting from breakage and damage to the wheel units and parts such as gearing, bearings, universal drive shafts, etc., by limiting the loads and shocks of these wheel drive parts to what they can take without breaking, while still delivering maximum power to each wheel, the company reports. Quickly and easily installed, the new method of driving through a multiple-disk friction which is always engaged and held together by a predetermined spring pressure limits the torque that can be delivered to each wheel. In addition, the company says, 4-wheel drive is obtained at all times; the differential unit can be eliminated; and independent action of each wheel is permitted at all times. Full details from Lee-Norse Co., Charleroi, Pa.

HIGH-STRENGTH BELT SPLICE QUICKLY INSTALLED (6)

"Minet" hinge-type conveyor-belt splice developed and used for 4 yr abroad now is available from the Hewitt Rubber Co. of Pittsburgh, Pittsburgh 22, Pa. It can be installed easily in a few minutes with a hammer and nippers and requires no measuring or use of templates, guides or accessory tools, it is said. The Minet splice set consists of two one-piece hinge halves, a cable hinge and sharp-pointed round copper rivets that do not cut or tear the belt fabric. A tight splice avoiding leakage is provided, danger of pullout is eliminated, rupture is much less likely and the splice will operate over much smaller pulleys and ride easily over idlers and scrapers, the company says. Folder with details and prices of four sizes for belts from ⅛ to 1 in thick is offered by the company.



NEW SYSTEM SIMPLIFIES DIESEL-FUEL INJECTION (7)

A new, revolutionary, and greatly simplified diesel fuel system, said to make diesel-fuel injection as simple, if not simpler than gasoline-engine carburetion and ignition systems, has been announced by Cummins Engine Co., Inc., Columbus, Ind. The new system, designated as the Cummins PT fuel injection system, completely eliminates fuel-rack adjustments, high- and low-pressure check valves, spring-loaded needle valves, helixes, distributor disks, metering pumps, high-pressure fuel lines, and the necessity for timing the fuel pump to the engine, it is said. It is now standard equipment on all models of Cummins diesel engines, from 60 to 600 hp, and can be applied to all Cummins diesels built since 1932. Designed by Cummins to eliminate the complication of the diesel fuel injection systems, thus simplifying servicing problems and reducing diesel engine maintenance and overhaul costs, the new PT Fuel System is so simple that the average mechanic can easily understand its mechanical workings in a few hours, the company points out. The unit weighs only 13 lb and has only 182 parts. Bulletin with full details from Cummins.

STEEL BUILDINGS (8)

Armco Drainage & Metal Products, Inc., Middletown, Ohio, announces a new-model 40-ft Steelox (interlocking steel paneled) building available in heights up to 20 ft. The units can be placed side by side, making the total floor area virtually unlimited in both width or length. Columns are placed every 40 ft in one direction and every 20 or 32 ft, as required, in the other. Additional features of the new Steelox structures are lean-tos and open sidewalls, which help adapt the units to a much wider range of conditions than formerly possible. Various improved details include continuous ridge ventilators, more attractive ceilings and sliding doors that are tighter and easier to operate. Bulletin with details from Armco.

STATIONARY BATTERIES FOR CONTROL, SWITCHGEAR (9)

A new line of stationary batteries specifically designed for use in switchgear, control and auxiliary power applications, announced by C&D Batteries, Inc., Conshohocken, Pa., are made in two complete lines, "PlastiCell" and "PlastiCal," in various capacities from 10 to 770 amp-hr. The PlastiCell has been designed for full-float operation where a life expectancy of 14 yr in float service normally applies. PlastiCal features lead calcium grids embodying engineering characteristics projected on a life expectancy of 25 yr in full-float service, and further reduces the maintenance required because water additions have been reduced to one-fifth to one-tenth of those required for conventional batteries, it is said. The range of types and sizes of the new C&D line was determined by collaboration with major control and switchgear manufacturers emphasizing the specific requirements for these services, the company reports. Full details from C&D.

HEAVY 6-WHEEL TRUCK (10)

A powerful, new, extra-heavy-duty, 6-wheel truck model, the International RF-230, specially designed for off-highway service, has been introduced by International Harvester Co., Chicago 1. The new model, with gross vehicle weight rating of 60,000 lb, is powered by the new 201-hp International RD-501 engine, which delivers 430 lb-ft torque at 1,600 rpm. The unit is designed for 8- or 9-yd concrete mixers, or for service in stripping operations, construction, earth-

Compact O-B Rail Clamp Has Wrench Fastened On-

You Never Have To Look For One!

- Small wrench fastened on O-B's new rail clamp eliminates chance of you getting caught without one. Wrench has swivel action and handle can be raised and lowered easily (as shown in illustration).
- Set screw in rail clamp bites through dirt and rust to give you finest electrical connection possible.
- Clamp is small enough to leave fastened on end of cable when you are ready to move.
- Compactness of clamp makes it safe for you to leave on track with cars passing -- yet it still fits on any rail up to and including 100 pounds.

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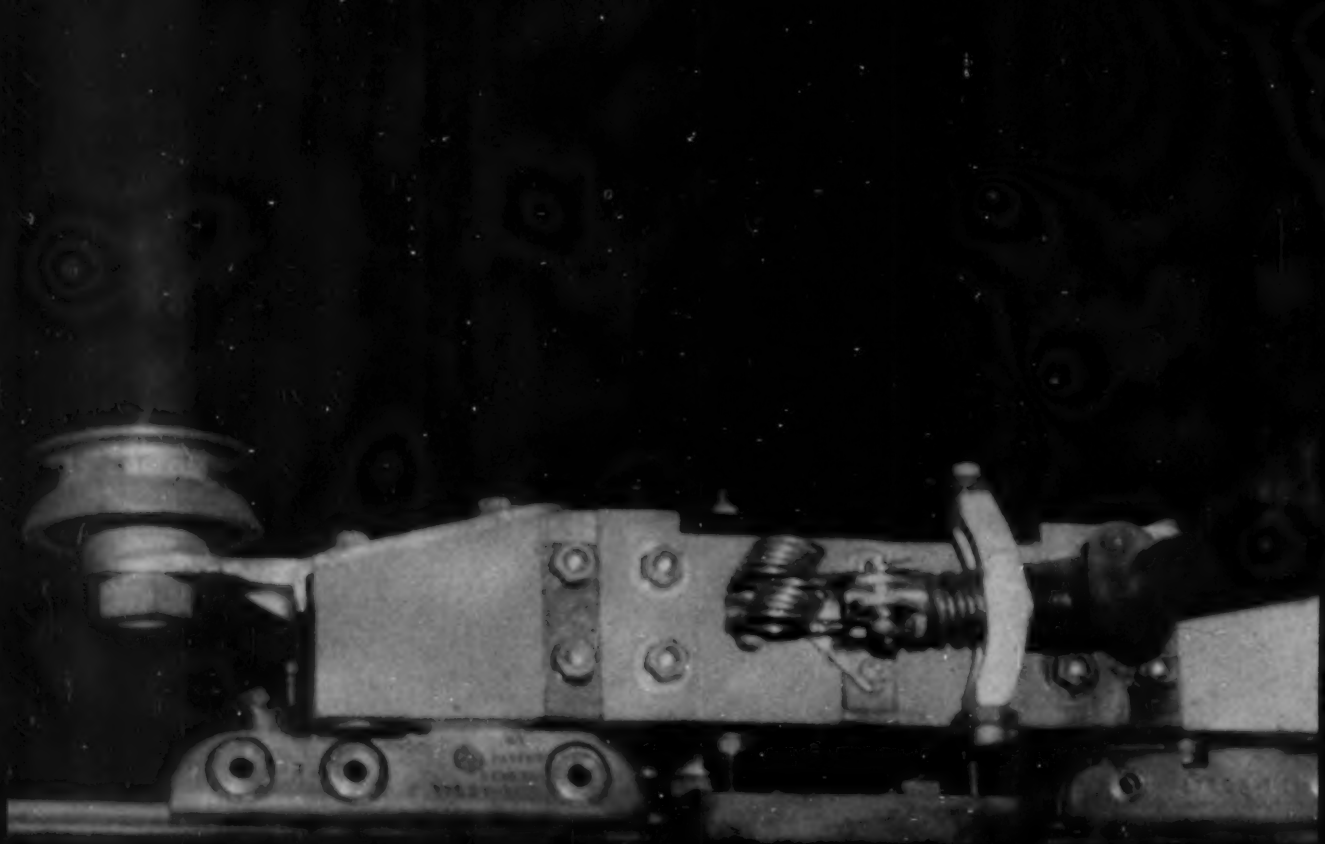
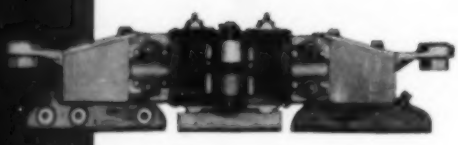


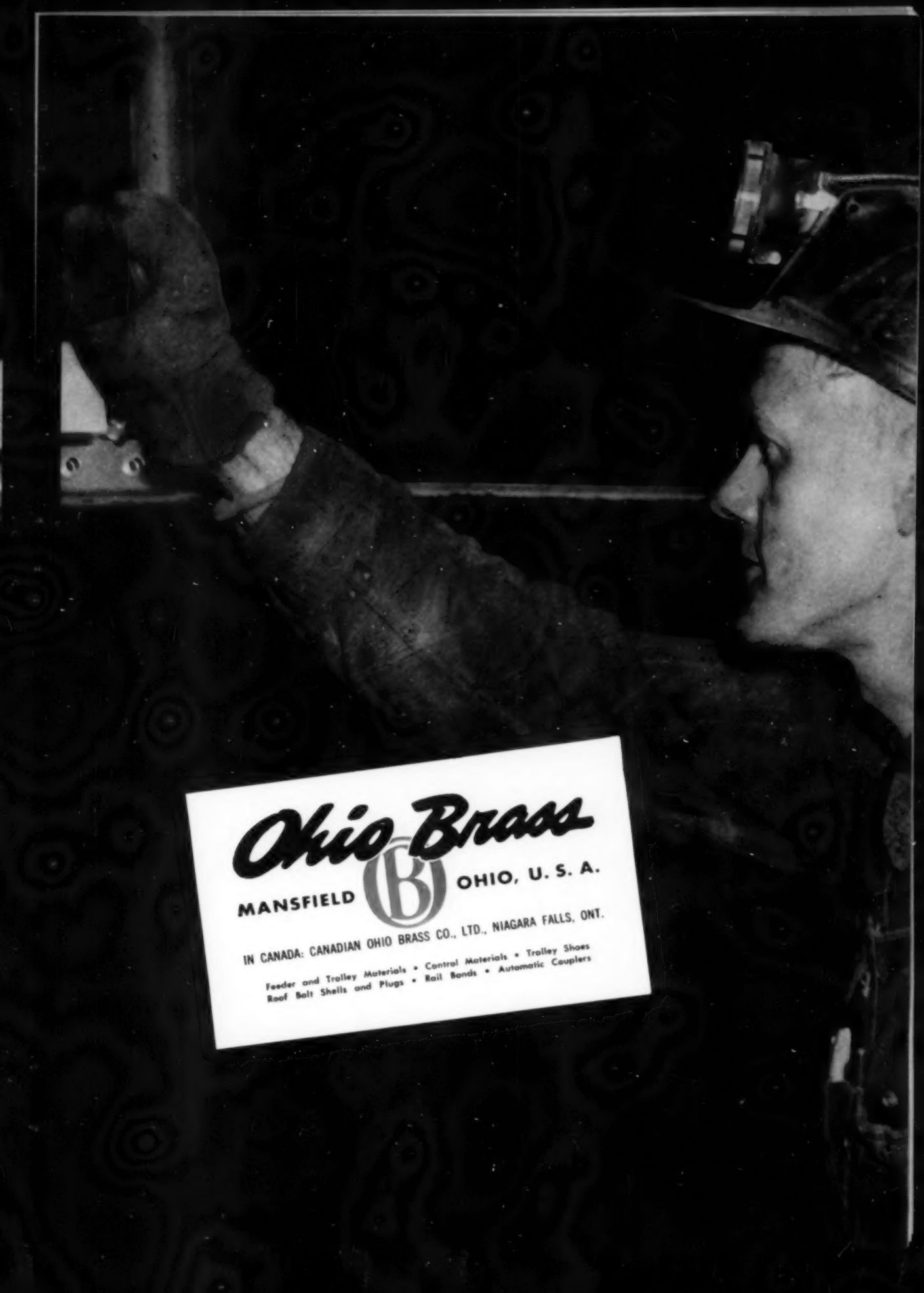
Type-R Switch Blowout Coils



Avoid Fire Hazards

Safeguard Opening of Switch Under Heavy Loads

- Exclusive blowout coil feature in O-B Type-R Section Insulator Switch allows switch to be opened under a heavy load in an emergency without endangering operator. Blows heavy arc away from switch and operator's hands while extinguishing it.
- Energized center runner on Type-R Switch is adjustable and you can angle it up or down at either end to accommodate different size wires and maintain a smooth underrun.
- Two torsion springs on handle base assembly provide a quick break action.
- End runners with hollow screws allow easy installation of trolley wire.


Ohio Brass
MANSFIELD
OHIO, U. S. A.
IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.
Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

New, Low-Cost Feeder Sling

Easy to Operate

- Just loosen the nut on O-B's new Thru-Bolt Feeder Sling, without taking the sling apart, and insert cable. Few turns of nut with hand will hold cable securely until tensioned and you can tighten with wrench.
- Maximum strength on side loads is assured by low over-all height. Small sling is only 2⅜ inches high, larger sling, 3¼ inches.
- Each size accommodates wide range of cables, Catalog Number 22454 from 4/0 to 1,000,000 cm inclusive, and Catalog Number 22455 from 500,000 to 1,750,000 cm.
- Can be used for either copper or aluminum cable.

Ohio Brass

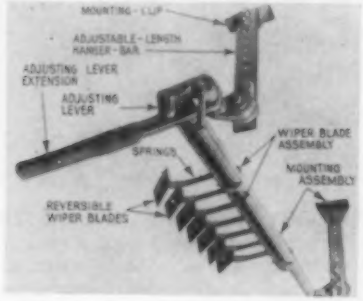
MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Feeder and Trolley Materials • Control Materials • Trolley Shoes
Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

4495-M

moving operations, etc., and is built to absorb severe shock loads, with the power needed to haul a full load over the roughest terrain on off-highway projects, the company reports. Equipment includes hydraulic, full-power steering; air brakes; 15,000-lb front axle; 46,000-lb rear bogie; 12-v electrical system; 60-gal step-type fuel tank; and 15-in clutch. Standard wheelbase is 175 in, with optional wheelbases available. Full details from company.



CONVEYOR BELT CLEANER (11)

The S-A spring-type conveyor-belt cleaner has steel wiper blades perpendicular to the belt surface, but diagonal to its line of travel, that scrape off material, allowing it to fall to the discharge chute. Spring-arm mounting permits blade pressure against the belt to be adjusted for different operating conditions. To eliminate any build-up of material on the spring arms, the new design incorporates a twist in the arm so that a vertical edge is exposed to the dribble falling from the wiper blades. Bulletin 651 with details from Standard Products Div., Stephens-Adamson Mfg. Co., Aurora, Ill.

IMPROVED AIR HOSE (12)

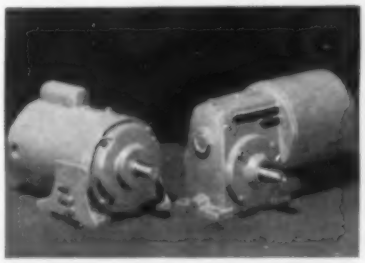
Hamilton Rubber Mfg. Corp., Trenton 3, N. J., has announced its newly improved Revelation air hose made from high-tenacity Cordura rayon cord that is thoroughly impregnated with a rubber cement and braided under tension on steel mandrels. Revelation is light and flexible, and is furnished with a Neoprene oil-resistant tube. The high-quality red cover resists extreme wear, abrasion, and severe service conditions, the company reports. Available in 50-ft standard lengths, in four sizes up to ¾-in for pressures up to 300 psi and 1-in for 250 psi. Prices and samples from company.

HAND-CARRIED WELDER (13)

The Royal Arc 200A, a small hand-carried welder weighing only 59 lb and guaranteed to weld with a 5/32-in electrode while operating on any single-phase 110-or 220-v current, has been announced by Royal Arc Industries, Inc., Chillicothe, Ill. Particularly designed for maintenance and repair, the unit cuts, brazes, solders, preheats and hard-surfaces, and requires no previous welding experience, the maker says. Low voltage eliminates danger of electrical shock and minimizes carbon precipitation to reduce brittleness in the weld. The company also makes a heavier Model 400A, for ¼-in rod on 220 or 440 v, weighing 140 lb and mounted on a wheeled base.

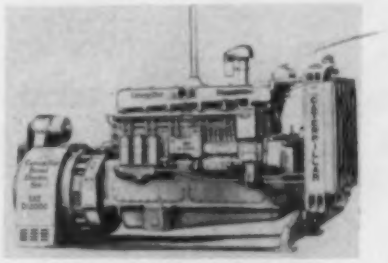
NEW JUMBO TIRES (14)

United States Rubber Co., New York 20, is now making in its Detroit plant the largest tires in its history—tires that weigh 2,600 lb and stand 8-ft tall—for use on large earthmoving and strip-mining equipment, bottom-dump trucks and self-loading scrapers. The nylon tires are 30.00 x 33 in size and have a 40-ply rating. The new giants are called U. S. Royal Con-Trak-Tors, and have a full lug tread design that insures excellent traction, the company says. Full details from United States Rubber.



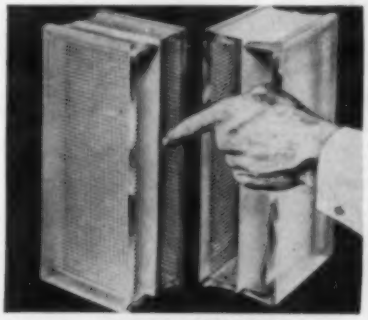
SMALLER GEAR-MOTORS (15)

A new line of fractional-horsepower gear-motors, smaller and lighter than previous designs, has been announced by the General Electric Co., Schenectady 5, N. Y. The new right-angle and concentric-shaft gear-motors are 10% lighter than previous models and because the driving motor is a close-coupled and positively geared to the output shaft, the units offer maximum transmission of torque, uniform speed and no slippage, G-E reports. The motors are reconnectable externally to reverse the direction of shaft rotation. Large bearings, with extra high thrust capacity, are locked to carry motor shaft thrust in either direction. Both motors are available in ratings of ¼, ⅓, ½, and ¾ hp, 115/230 v single-phase and 220/440 v 3-phase, the concentric-shaft motor from 13.5 to 520 rpm and the right-angle unit from 24 to 148 rpm.



IMPROVED ELECTRIC SET (16)

New changes in the design of its D13000 diesel engine resulting in increased outputs have been announced by the Caterpillar Tractor Co., Peoria, Ill. The D13000 diesel-electric set now operates at 1,200 rpm, with an increase in capacity from 80 to 100 kw. Increased output in the 6-cylinder, four-stroke cycle engine resulted in a number of major changes. Positive-action valve rotators, replaceable valve seat inserts and larger, stronger valves combine increased engine breathing ability with longer valve life, thus making possible additional horsepower output and lower maintenance costs, the company reports. Details from Caterpillar.



GLASS BLOCKS CONTROL SUN'S GLARE (17)

New, double-cavity glass blocks for exterior walls and roofs, which provide a soothing glow of daylight even in the harshest sunlight, have been announced by Pittsburgh Corning Corp., Pittsburgh 22. Called "Suntrol," they are hollow glass blocks with pale green fibrous glass diffusing screens sealed into their centers. While the two partial vacuums in the blocks keep out much of the sun's heat, the light coming through the green filter actually makes people feel cooler and more relaxed regardless of the temperature, according to the company's research. Suntrol is an addition to the company's line of functional glass blocks featuring light-directing patterns to throw light about a room.

FLEXIBLE PLASTIC PIPE (18)

A new lightweight flexible plastic pipe developed by Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia 24, is made of 100% virgin polyethylene

resin and guaranteed to be non-toxic. Known as Series 200, it will not rot, rust, or corrode, is easily handled, requires no special tools to install, is economical and will last indefinitely, the maker reports. Full details on a wide range of sizes from Quaker Rubber.

POWER UNIT (19)

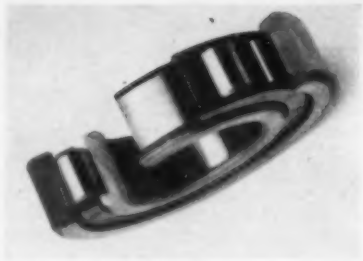
New International U-282 carbureted engine and power unit, replacing the current U-269, develops 66.3 net hp at 1,800 rpm to 75.5 net hp at 2,400 rpm for intermittent load application. Maximum net torque is 204 lb-ft at 1,225 rpm. External dimensions of the power unit and engine are identical with the U-269, and the U-282 has a hard copper-chrome alloy-iron crankcase for long cylinder life, instead of replaceable sleeves. While regularly equipped to burn gasoline, the U-282 is also available with combination gas-gasoline and LPG attachments. Complete specifications from International Harvester Co., Chicago 1.

CLOSED-CIRCUIT TV (20)

The new Diamond Series 400 "UtiliVue" closed-circuit television includes various features to assure uniform picture quality and operating stability, the maker says. The UtiliVue camera can be used either with a video monitor or with a standard TV receiver and can be tuned to any channel from 2 to 6. All controls and power supply are built into the camera, so that no separate power unit or costly multiconductor cable are needed, it is pointed out. UtiliVue equipment is being distributed by Graybar Electric Co., New York 17, which offers Bulletin 1175 with full details.

HIGH-SPEED BEARINGS (21)

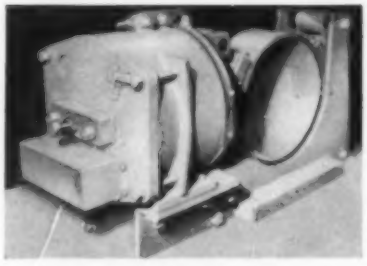
In a typical application, two Rollway LR-U type Tru-Rol roller bearings support the rotor shaft of a Westinghouse 614 MC electric motor used to power



steel mill auxiliaries, cranes, hoists, shovels, or bridges or conveyors. At the 100-hp motor's rated speed of 460 rpm, each bearing has a rated load capacity of 10,500 lb, based on a normal life of 10 yr of service at 40 hr a week. Made by Rollway Bearing Co., Inc., subsidiary of Lipe-Rollway Corp., Syracuse, N. Y., the LR-U type Tru-Rol bearing features a steel-segmented type of cage that provides sufficient strength and accuracy to retain and guide the crowned rollers at high speeds. Crowning relieves operational stresses at the ends of the rollers. Although designed normally to handle heavy radial loads, the bearing has a double-flange outer race and single-flange inner race that not only locate the motor rotor shaft in its proper relation to the stator, but also absorb any normal end thrust pressures imposed by the drive to which the motor is coupled, the maker reports. Full data from Rollway Bearing.

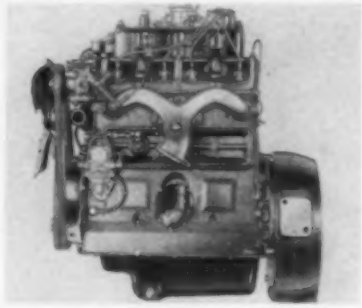
PLANETARY TRANSMISSION (22)

A new compounded double planetary-type transmission of 150 lb-ft input torque for use with a torque converter having a 2.12 multiplying factor is offered by the American Gear & Mfg. Co., Lemont, Ill., subsidiary of Brad Foote Gear Works, Inc. Designed for fork-lift trucks, hoists, cranes, car pullers, slushers, earthmovers, etc., the PGT-150 "Plan-Gear" transmission can be shifted from any place convenient to the operator but with complete disregard to location of the transmission, from full speed forward to full speed reverse in only 1½ sec without vibration or jerk, the maker says. Complete control is accomplished by moving a single hydraulic valve lever, and no damage to the transmission results from wilful abuse, it is said. Bulletin 3270 with full details from American Gear & Mfg.



DC MAGNET BRAKES (23)

A complete new line of DC magnet brakes featuring reduced maintenance, easy single-point adjustment and long life has been announced by the General Electric Co., Schenectady 5, N. Y. The new brakes were developed to meet the AISE DC Mill-Motor Brake Standard 11, and are used for heavy duty applications in mill drives, materials handling, marine service, and on bridges, etc. The new line will cover the standard's 8-, 10-, 13-, 16-, 19- and 23-in-diameter wheels. Full details from G-E.



STURDY INDUSTRIAL ENGINE (24)

The new Industrial Engine Dept. of Willys Motors, Inc., Toledo, Ohio, has introduced a 4-cylinder F-head-design engine for more widespread use in industrial, construction and other equipment. Based on designs perfected for the sturdy military Jeep, with the F-head combining valve-in-head and valve-in-block construction, the Model 4F is considered a most efficient and economical 4-cylinder engine, with the highest ratio of horsepower to cubic inch displacement, the maker says. It's maximum brake horsepower at 2,400 rpm is 51 hp and at 4,000 rpm, 70 hp, with maximum torque of 111 and 91 ft-lb, respectively. In addition to Model 4F, Willys will offer three other models, the 4-cylinder L head engine and 6-cylinder engines with either the F- or L-head design. Bulletin available.

CRANE FOR TRUCK MOUNTING (25)

A new self-contained materials-handling crane for trucks, introduced by Truck-Crane, Inc., Chicago 27, is said to convert any standard truck into a dual-purpose hauling and handling unit. The "Truck-Crane" will lift up to 5,000 lb at one time, swing it onto the truck, lift it off, and spot it anywhere desired within a 16-ft 280-deg radius of the truck. Hydraulically operated and controlled, the complete unit takes up only 18 in of space behind the truck cab and is available with a telescoping elevating boom extending up to 22 ft. Details from the maker.

PLASTIC PIPE WITHSTANDS EFFECTS OF SUNLIGHT (26)

A new polyethylene-base lightweight, flexible plastic pipe designed to eliminate

GENERAL CABLE

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

New SUPER SERVICE

heavy duty cords and cables

GREATER CRUSH RESISTANCE

GREATER CUTTING RESISTANCE

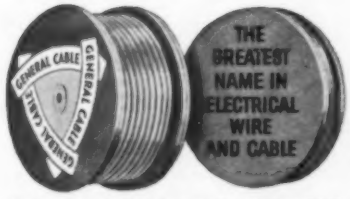
CHECK THESE MONEY-SAVING FEATURES...

Every type in the completely new line of **SUPER SERVICE** resists impact, crushing and cutting far beyond accepted field requirements. Special cord reinforcement provides vital extra tensile strength and increases wear. **SUPER SERVICE** needs less replacement...costs no more! Look at these money-saving features:

SUPERTUF—General Cable's new mold cured jacket—is free from ply separation, resists tearing and abrasion. New, more compact design prevents sleeving of the jacket from the core. Flame resistance far exceeds requirements of the Federal Bureau of Mines. New **SUPER SERVICE** meets all IPCEA specifications.

THERMAX heat resistant insulation, another **SUPER SERVICE** improvement, provides top protection against temporary current overloads and extends the operating life of the cable.

Result: a well balanced product that performs better, lasts longer...costs no more! Why settle for less! Remember— General Cable is the only manufacturer able to fill *all* your wire and cable needs. It pays to buy in one place!



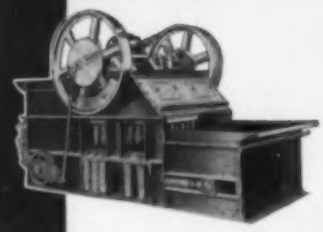
BARE, WEATHERPROOF, INSULATED WIRES and CABLES FOR EVERY ELECTRICAL PURPOSE

GENERAL CABLE CORPORATION

420 Lexington Avenue, New York 17, New York • Sales Offices: Atlanta • Boston • Buffalo Chicago • Cincinnati • Cleveland • Dallas • Detroit • Greensboro (N. C.) • Houston • Indianapolis • Kansas City • Los Angeles • Memphis • Milwaukee • Minneapolis • New York • Newark (N. J.) • Philadelphia • Pittsburgh • Portland (Ore.) • Richmond (Va.) • Rochester (N. Y.) Rome (N.Y.) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.

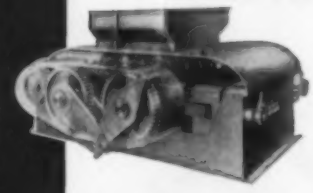
America's most complete line of CRUSHING EQUIPMENT

AVAILABLE FROM STOCK AND ON SHORT DELIVERY



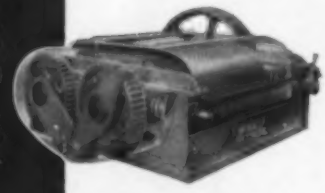
McNally Norton Vertical Pick Breaker

50% less fines when reducing lump to egg and stove sizes.



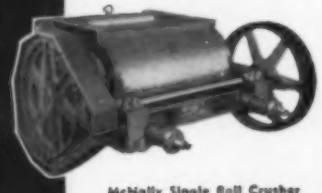
McNally Double Roll Gearmatic R. O. M. Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating Gearmatic drive.



McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages:
High volume production, plus accurate sizing, plus low percentage of fines.



McNally Single Roll Crusher

Universal application. 20", 24" and 36" dia. rolls.

For immediate action on complete information write, wire or call . . .

Mc

★ Pittsburg, Kansas ★
★ Wellston, Ohio ★

the deteriorating effect of sunlight, has been announced by Munray Products, Inc., Cleveland 11, Ohio. Use of a new-type polyethylene compound results in a single type of non-toxic, non-contaminating flexible pipe usable in buried as well as above-grade installations, to convey potable liquids, slurries, chemicals, etc., and also as electrical conduit, the company says. Other features cited include an unconditional guarantee against electrolytic corrosion, rust and rot; extremely low friction loss; no interior build-up; and immunity to the effects of corrosive waters, soils, various chemicals, etc. Munray all-purpose plastic pipe is furnished in nine standard sizes up to 6 in in diameter. Data from company.

VERTICAL SPEED REDUCER (27)

The American Pulley Co., Philadelphia 29, offers a new line of vertical Shaft-King speed-reduction drives available from stock in both 13:1 and 20:1 ratios for requirements through 42 hp. The shaft-mounted units feature helical gears cut from alloy-steel forgings; both ball and tapered-roller bearings; a three-wall, internally-ribbed cast-iron housing providing permanent gear and bearing alignment; extra-large oil reservoir; and patented concentric-shaft design. They also can be supplied with a Torque-Arm overload release.

INTERNAL PHONE SYSTEMS (28)

Belmont Inter-Phone systems, an automatic internal communications system, manufactured by the General Electric Co., Ltd., of England, for use in widely varied climatic areas and in isolated localities, is available on either a rental or purchase basis from the Belmont Electric Co., Inc., New York 16. Powered by heavy duty batteries, the Belmont systems require no operator, are immune to power failures or disturbances caused by electronic deficiencies and provide efficient internal communications at substantially reduced operating and purchasing costs, the company says. Various equipment and arrangements permit highly flexible systems adaptable to user's needs. Full data from company.

FREE BULLETINS AVAILABLE

(30) DUST-COLLECTING BOLTING DRILL—The newly introduced Holman Dryductor, a dust-free dry rock drill, is fully described in Catalog 5410 available from the Goodman Mfg. Co., Chicago 9. Designed for complete dust removal without water in drilling roof-bolt holes, the unit extracts dust as made, passes it through the rock drill and draws it by pipe line to a container away from the face.

(31) COAL CRUSHERS—WC and WS Series Rolling Ring coal crushers are fully described in bulletin offered by the American Pulverizer Co., St. Louis 10, Mo. Covered are the special construction elements said to provide greater coal reduction at lower operating costs, including the Rolling Ring crushing principle originated by American, full specification and selection data on the units, which vary in capacities from 15 to 188 tph, depending on feed.

(32) EARTHMOVERS—A new 70-p edition of General Catalog GC-5A describing Bucyrus-Erie's complete line of excavating, drilling and materials-handling equipment, is designed for quick reading and features concise copy, condensed specifications and over 100 photos of specific jobs. Several recent additions to the company s line are included in sections entitled Quarry and Mine Shovels (2½ to 8 yd) and Blast Hold Drills; Stripping Shovels (18 to 36 yd); and Walking Draglines (4 to 30 yd). Available from Bucyrus-Erie Co., S. Milwaukee, Wis.

(33) SHUTTLE CARS—Bulletin 5411 provides specifications, dimension drawings and detailed data on design and operating features of two Goodman cable-reel shuttle cars; the Type 870, with a basic height of 26 in for low coal; and the Type 670, with a 32-in basic height for intermediate-height coal. Offered by Goodman Mfg. Co., Chicago 9.

(34) MINE EQUIPMENT—Booklet from American Mine Door Co., Canton 6, Ohio, is designed to facilitate a "spot check" of various mine operations to analyze lower costs and greater safety made possible by application of Canton mining equipment. Discussed are applications of Canton self-closing doors, rock-dusters, car transfers, track cleaners, track devices, trolley-line material, cable splices and vulcanizers.

(35-36) VIBRATING SCREENS – Two new expanded lines of vibrating screens are described in detail in bulletins from the Bonded Scale & Machine Co., Columbus 7, Ohio. Circle 35 on the postage-free card for Bulletin 1087 on Bonded heavy duty 4-bearing eccentric-shaft screens available in 31 models, in single and multiple decks, and sizes from 3x8 to 5x14 ft. Circle 36 for Bulletin 1086 devoted to 10 models of 2-bearing, eccentric weight Bonded general-purpose screens, 2x4 to 3x8 ft, in one, two and three decks, open, covered and totally enclosed models.

(37-38) HAULAGE TRUCKS – Athey Products Corp., Chicago 38, offers separate bulletins providing full details on the features and applications of two new coal-haulage units. Circle 37 on the postage-free card for catalog covering the new 40-ton high-speed Athey PH20 coal hauler and its teammate, the 275-hp Caterpillar DW20. Circle 38 for Catalog PR-1014 describing the Athey PR21 rear-dump unit featuring a 22½-yd capacity and powered by a Caterpillar DW21.

(39) BATTERY LOCOMOTIVES—Operating features, construction and full specifications on six Mancha Trackmaster storage-battery locomotives are covered in Bulletin M-549 offered by the Mancha Div., Goodman Mfg. Co., Chicago 9. Illustrated and described are units rang-

take a bite out of your operating costs

WITH YELLOW STRAND!

Wire rope is a small part of your operating costs, yet the right wire rope can give your profits a big boost. Wire rope — that can be reeved easily, that has resistance to shock and strain, that gives *extra* hours of service — can lower your operating costs and improve profits. *Such a rope is Yellow Strand. It's more flexible, resists wear, has an in-built strength that prolongs service life. Yellow Strand can give your profits a boost!*

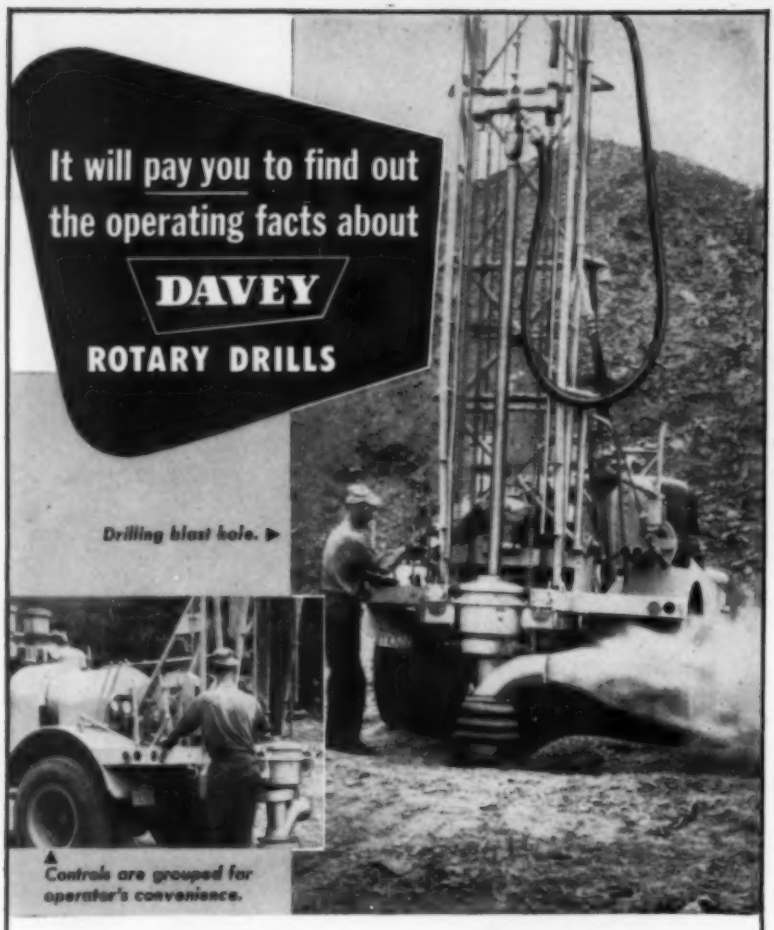
Try just *one* reel of Yellow Strand and *compare* service and costs. Your nearby Broderick & Bascom distributor can help you get this proof of profit. Give him a call!

When you call your B & B distributor . . . ask about his Speedi-Service Plan — a plan where your wire rope needs are registered. Then when new ropes are needed, a one-minute phone call sets Speedi-Service in motion. Needs are determined from the files; your order is filled from controlled stocks; your rope is ready in minutes instead of hours; you save manhours, equipment hours . . . *and you get the best rope made* — Yellow Strand!

BRODERICK & BASCOM ROPE CO., 4203 Union Blvd., St. Louis 15, Mo.

FOR SAVINGS . . . SAFETY . . . SPEEDI-SERVICE

Yellow Strand®


It will pay you to find out
the operating facts about
DAVEY
ROTARY DRILLS
Drilling blast hole. ▶
▲ Controls are grouped for operator's convenience.

for construction jobs... coal work... quarrying

shot holes...blast holes...core drilling...structure testing
water well drilling...oil exploration

Here, at last, is the new line of rotary drills that operators have always wanted and needed.

Available in several "air blast" or "mud pump" models to meet individual requirements, Daveys drill faster and more economically than previously available units. For example, rated capacity of Model M-8A (as illustrated) is 5⅝ inch holes to a depth of 300 ft. with air and 7⅞ inch holes to 2,000 ft. with mud. Suitable for mounting on any make of truck, Davey Rotary Drills may be driven from the truck engine by a power take-off or by a separate gasoline or diesel engine. AA-202

DAVEY
pioneers of "air-cooled air"

Write today for Full Details!

DAVEY COMPRESSOR CO.
KENT, OHIO

ing from 2½ to 6 tons, operating weight, for varying applications.

(40) BLASTHOLE TOOLS – Bulletin from Spang & Co., Butler, Pa., contains full data on the Spang line of churn-drill tools for blastholes, including heat-treated bits, drilling stems, blade sections, etc. Helpful information included outlines procedure for drilling large holes, dressing and hardening of cable-tool bits, cause and cure of various bit troubles.

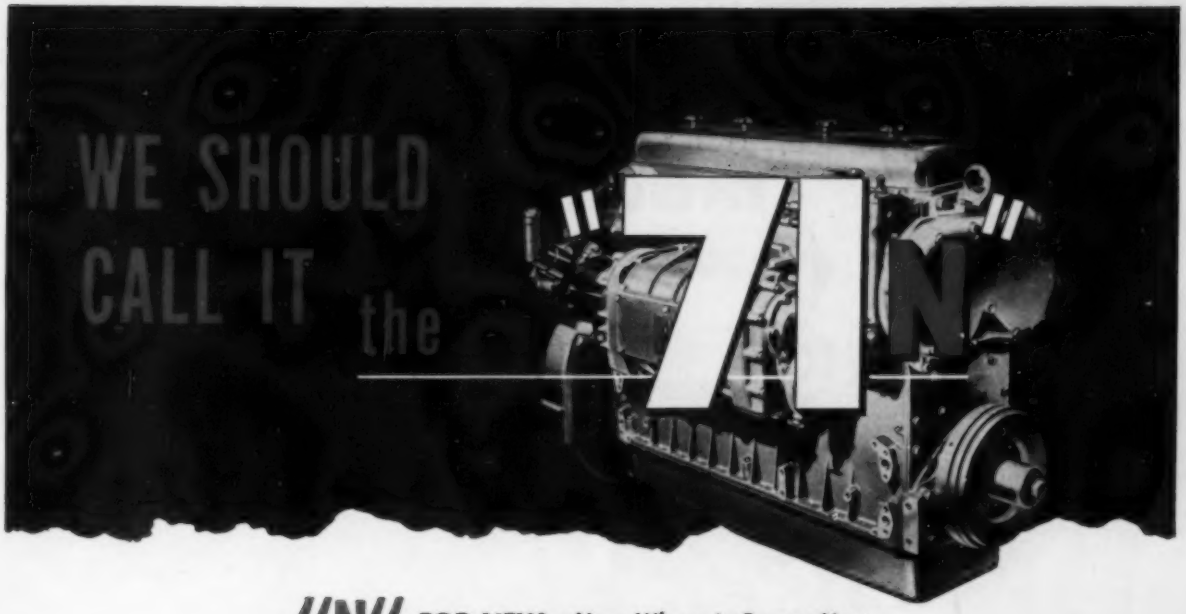
(41) ABRASIVE PUMPS—Allis-Chalmers Type NRL improved rubber-lined pumps described in a new bulletin are designed for handling abrasive, fine-mesh material—¼ in to 325 M—and are available in open- or closed-impeller models at capacities from 10 to 3,000 gpm at heads through 140 ft. Bulletin 52B8156 is available from Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

(42-43) GRINDING WHEELS — New 28-p condensed Catalog 1052 of the most widely used grinding wheels carried in stock, recently published by Norton Co., Worcester 6, Mass., is available by circling 42 on the postage-free card. Including prices, the booklet discusses grinding-wheel selection in considerable detail, covering abrasive types, bonding materials, wheel speeds, wheel markings, standard wheel shapes, mounted points and abrasive polishing grain, with tables of wheel specifications for hundreds of common applications. Another new Norton catalog containing a comprehensive assortment of standard sizes of diamond grinding wheels and hones also includes prices and information on diamond-wheel markings, selection of wheels, standard shapes of wheels and suggestions on use. Circle 43 on the return card for Catalog 1233 on diamond wheels.

(44) CRAWLER TRACTORS – Booklet D438 depicting improved methods of crawler tractor manufacturing over the last 50 yr has been released by Caterpillar Tractor Co., Peoria, Ill. The booklet, written in conjunction with the 50th anniversary of the crawler tractor, gives a brief history of track-type tractor manufacture and also highlights the company's "no parts orphans" policy which assures Caterpillar owners that parts always are available for their machines no matter how old.

(45) CENTRALIZED LUBRICATION– In a 24-p pocket-sized "comic book" cartooning and lampooning various grease-splotched misadventures encountered with certain industrial lubrication practices, the Alemite Div. of Stewart-Warner Corp., Chicago 14, discusses the application of centralized lubrication. The booklet, Form 34-22, is designed to show how use of Alemite "Accumeter" measuring fittings eliminates all the down time, safety hazards, bearing failures, lubricant waste and other negatives inherent in various types of lubrication.

(46) THICKENERS—The Denver spiral rake thickener, a simple mechanical rake and settling unit for the separation of solids from liquid, is covered in a new



"N" FOR NEW—*New Where It Counts Most*

You don't have to be an old-timer to remember when the first General Motors Series 71 Diesel was introduced. We called it the "71" in 1938 and we call it the "71" today.

But in 17 years these design improvements from top to bottom have given operators higher horsepower, lower fuel consumption and longer engine life. And now, a whole series of new improvements has made this fast-stepping, compact, 2-cycle Diesel better than ever.

NEW **17 TO 1 COMPRESSION** gives better fuel economy, squeezing more power from every gallon of fuel.

NEW **"FIGURE 8" CYLINDER LINERS** give you a cleaner burning, more efficient engine. Air intake area is increased 32% for more complete fuel burning and better exhaust.

NEW **IMPROVEMENTS IN PISTON PIN, PIN RETAINER AND CAM FOLLOWER DESIGN** mean longer life, less maintenance cost. High-valve unit injectors last longer because the valve assembly is away from high cylinder temperature areas. Hard-chrome steel "Lite-Tite" piston rings resist wear; are tougher and more flexible and give many more hours of service.

And—best of all—in your next overhaul you can incorporate any or all of these new improvements in any GM Series 71 Diesel engine you're operating today. "The Inside Story" tells you how these new improvements can help cut your costs and speed your jobs. Mail the coupon today for your copy.

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Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

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General Motors Corporation
Detroit 28, Michigan

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"The best machinery built"

—GORDON W. GRAY, *superintendent, Birchfield Mining Co.*

This Caterpillar No. 212 Motor Grader keeps 13 miles of haul road fast and smooth. It also cleans up around the shovel working a five-foot seam of Clintwood hard coal at the Birchfield Mining Co.'s stripping operation in Wise County, Va. The company also owns a fleet of Caterpillar rubber-tired and track-type Tractors.

"In my estimation, Caterpillar makes the best machinery built," says Gordon W. Gray, superintendent. "Relationship with our dealer is exceptional." The company mechanic adds, "Cat* equipment is the easiest to maintain."

The economical No. 212 can pay for itself in terms of faster cycle times and reduced equipment wear-and-tear on *your* haul roads. It's low in initial cost, and low in operating cost because of its sturdy yet simple Caterpillar construction. The Caterpillar Diesel Engine delivers full power for only pennies per hour on money-saving No. 2 furnace oil. It's a Caterpillar Motor Grader through and through: excellent visibility, positive, non-creeping controls, and wide range of blade positions without stopping to change links.

Only Caterpillar Motor Graders are made entirely by a single manufacturer. This means true balance between power, weight and working speed—no compromising to "make do" with available components. It also means dependable parts and service from a *single* source—your nearby Caterpillar Dealer. See him now for an on-the-job demonstration of the No. 212 Motor Grader. He can arrange delivery in time to give *your* roads a "spring tonic" for more profitable operation.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (October, 1954)

1	6	11	16	21	26	31	36	41	46	51	56	61	66	71	76	81
2	7	12	17	22	27	32	37	42	47	52	57	62	67	72	77	82
3	8	13	18	23	28	33	38	43	48	53	58	63	68	73	78	83
4	9	14	19	24	29	34	39	44	49	54	59	64	69	74	79	84
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85

In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

Name (Print) ..... **Position** .....

Company .....

Address .....

NOT GOOD if mailed after Dec. 1, 1954

12-p Bulletin T5-B5 available from the Denver Equipment Co., P. O. Box 5268, Denver 17, Colo. Dimensions, specifications and capacities of steel, wood or concrete thickener tanks in sizes ranging from 3 to 80 ft are given, together with features and applications.

(47) ELECTRICAL INSULATION—Catalog 542 from the National Electric Coil Co., Columbus 16, Ohio, provides detailed data, with prices, on its full line of insulating materials. Covered are mica products, tapes, varnished and plain fabrics, sleevings and tubings, solders and varnishes, etc., and various tools, testers, etc.

(48) SAFETY CLOTHING—Booklet describes the full Pulmosan line of asbestos gloves and mittens; chrome leather clothing, including aprons, welding jackets, gloves; and Pulmotek (vinyl) clothing. Available from Pulmosan Safety Equipment Corp., Brooklyn 17, N. Y.

(49) STEEL CHAIN—Entitled "Quick Facts About Chain," new bulletin has data on chain for load binding and tie-down, towing, tail-gates, etc., with specifications and load limits for alloy steel chain especially made for lifting purposes. From Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80.

(50) INDUSTRIAL PRODUCTS—American Brake Shoe Co., New York 17, offers its first complete catalog, a 48-p booklet illustrating representative industrial products and parts produced by its 11 divisions. Set up by type of product, the catalog contains sections on ferrous castings, non-ferrous castings, bearing materials, sintered metals, steel forgings, welding products, air compressors, industrial pumps, dredge pumps and railroad products.

(51) MOTOR CONTROLS—The "Tools of Automation," a new 12-p booklet issued by Reliance Electric & Engineering Co., Cleveland 10, Ohio, discusses combining of applied engineering, creative thinking and electric motor drives to provide for "automation" of single machines or continuous processes. Covered are in choosing the "right motor for the job"; Adjustable-Speed V*S drives; and electronic controls and regulators that provide precise, accurate motor drive control and regulation.

(52) INDUSTRIAL FIRE HOSE and fittings are described in a catalog offered by the Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass. Covering the complete line of fire and suction hose, extinguisher tubing and fire hose couplings, the 8-pg folder lists full specifications, construction, recommended use and working pressures.

(53) AIR COMPRESSOR—Bulletin describes the Le Roi 105-cfm Utility air compressor said to be suited for a variety of jobs because of its space conserving portability and also for mounting transversely against a truck cab without exceeding the maximum truck width regulation for any state. Offered by the Le Roi Co., Milwaukee 14, Wis.

(54) CONCRETE BINS—29-sheet technical brochure on concrete-stave storage bins (silos) will be sent upon request to recognized engineers by The Neff & Fry Co., Camden, Ohio. The "Engineers' Brochure" contains full specification and capacity data, construction descriptions, information on Super-Concrete Stave with test data, detail drawings of various parts, installations photos, etc.

(55) POWER TAKE-OFFS — Bulletin 506, describing the performance of, and giving complete engineering data on Twin Disc disconnecting fluid power take-off Model 21 HUD-O and Model 27 HUD-OO, is available from the Twin Disc Clutch Co., Hydraulic Div., Rockford, Ill. On drilling rigs, hoists, shovels, draglines and other heavy-duty applications that demand frequent and complete disconnection of power source from driven equipment, the new Twin Disc Model HUD is said to offer a combination of steam-smooth characteristics of fluid connection with positive release from the driven load.

(56) CONVEYORS OF ALL TYPES, bucket elevators and feeders, parts and accessories are fully described and illustrated in new Bonded Catalog 54. Included are 32 pp on troughing idler conveyors, pulleys, idlers, takeups, etc.; a full range of flight conveyors; belt- and chain-type bucket elevators; feeders; and a complete line of industrial conveyors, stackers, etc. From Bonded Scale & Machine Co., Columbus 7, Ohio.

(57) MACHINERY PARTS—A new 24-p brochure offered by Penn Machine Co., Johnstown, Pa., which specializes in gears, sprockets, shafts, bronze castings and similar parts, includes details on the company's planning procedures, engineering, facilities, testing and inspection processes, and the wide variety of parts Penn Machine is equipped to produce.

(58) TRACTOR-TRAILER—Full application details on the new Athey Universal trailer, designed to haul heavy and bulky loads wherever a track-type tractor can travel, are provided in folder from Athey Products Corp., Chicago 38.

(59) HOW TO CUT POWER TRANSMISSION COSTS by using standard Cone-Drive reducers, gearsets and components is suggested in Bulletin 789-54 available from Cone-Drive Gears Div., Michigan Tool Co., Detroit 12, Mich. Included are brief descriptions of standard components, with horsepower ratings, reductions and pinion speeds.

(60) BULK PNEUMATIC HANDLING—16-p Bulletin G-2 from the Fuller Co., Catasauqua, Pa., tells how handling costs can be reduced substantially by using the proper pneumatic handling system for conveying such materials as pulverized coal, fly ash, etc. Also covered are the Fuller rotary compressor.

(61) GROUTING of heavy equipment with Embeco non-shrink mortar is discussed in 16-p Bulletin E-1c from the Master Builders Co., Cleveland 3, Ohio. Covered are some common methods of grouting different types of equipment, mixing and placing of grout, cold and hot weather grouting, measurable characteristics of Embeco, recommended mixes and estimating tables and actual installations.

(62) ELECTRODES—Full descriptions, application and procedure data on all Murex mild-steel and low-alloy arc-welding electrodes are included in a new 30-p catalog offered by Metal & Thermit Corp., New York 17. Designed to help select the right electrode for the job, the catalog also contains formulae for estimating welding costs, heat-treating procedures, hardness-conversion tables, and other useful reference material.

(63) EQUIPMENT AND STRUCTURES for handling coal, ore and other bulk materials are described in a 32-p booklet from the Dravo Corp., Crane & Bridge Dept., Pittsburgh 25, Pa. It discusses mechanical, electrical and structural features of such equipment as ore and coal bridges, man trolley unloaders, rope-operated towers, etc.

(64) CARBON MONOXIDE RECORDER—Data Sheet 10.15-7a has been re-

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vised to describe the Mine Safety Appliances Co.'s carbon-monoxide recorder, a system which uses a Brown ElectroniK potentiometer to record and/or control low concentrations of carbon monoxide wherever it presents a hazard to personnel or must be measured and controlled. Offered by Industrial Div., Minneapolis-Honeywell Regulator Co., Philadelphia 44.

(65) PNEUMATIC CONVEYING—Bulletin 105 from Convair, Pittsburgh Pa., contains descriptions and flow diagrams of actual installations of Convair pneumatic conveying systems in various industries for handling a wide range of products, including dusts and carbon black.

(66) INSTRUMENTATION — Bulletin 100-C lists for easy reference all current Honeywell Industrial Div. literature on a wide line of instruments, recorders, indicators, measuring and controlling devices, etc. Offered by the Industrial Div., Minneapolis-Honeywell Regulator Co., Philadelphia 44.

(67) HAND TACHOMETERS—Bulletin 103 describes the new Metron "3 in 1" unit designed to measure speeds of rotating parts and moving surfaces and featuring three separate ranges in one instrument. Only one range appears at a time and ranges are selected by merely flipping a switch. From Metron Instrument Co., Denver 3, Colo.

(68) STEEL CHAIN — Catalog Sheet 4140-19 describes the new Beaumont Birch No. DT-132B "Dura-Tred" "Beaucolloy" steel combination chain designed for use with "Trac-Pull' wheels and used on all types of bucket elevators or conveyors handling bulk materials. From the Beaumont Birch Co., Philadelphia.

(69) FUSE REDUCERS—Bulletin 8 describes application of Trico fuse reducers designed to permit use of standard or dual-element cartridge fuses of sizes smaller than fuse clips are intended for, requiring no more space than standard fuse. From Trico Fuse Mfg. Co., Milwaukee 12, Wis.

(70) POWER TRANSMISSION—Bulletin B20-53 available from Morse Chain Co., Detroit 10, Mich., describes its complete line of power transmission products, including silent chain, roller chain and Hy-Vo drives; sprockets, cable chains, drive shafts, couplings and clutches; Taper-Lock sprockets, cam clutches and torque-limiting clutches.

(71-72) AIR-COMPRESSOR MAINTENANCE—Locating troubles in vertical water-cooled air compressors is one of a series of "Trouble Savers" on preventive maintenance issued by Worthington Corp., Harrison, N. J. Circle 71 on the postage-free card for Folder L-676-M1 designed to help operators of YC and DYC compressors. For complete series covering centrifugal, rotary, water- and air-cooled units, etc., circle 72 for Folders PC-305 and PC-306.

(73) CORROSION PROTECTION of iron and steel surfaces with "Galvicon" is described in detail in Technical Bulletin 452 offered by the Chemical Div., Galvicon Corp., New York 1. Galvicon is applied by brush or spray method to combine with the base metal and actually galvanize it, and in most cases will outperform the standard zinc coatings applied with heat, the maker reports.

(74) HEATING SYSTEMS—Five major types of steam-heating systems, with and without control, and a full line of valves, traps and steam power specialties, are described in detail in a new 20-p condensed catalog, Bulletin 110, offered by Illinois Engineering Co., Chicago 8, Div. of American Air Filter Co., Inc.

(75) SAFETY FLOORING—DPS Masterplate, developed to meet the requirements of hard-surface safety flooring, particularly where explosives are handled or explosive dusts are present, is described in Bulletin 38 from the Master Builders Co., Cleveland 3, Ohio. According to the maker, it is easy to use and produces a surface that is static-disseminating, spark-resistant, non-combustible and wear-resistant.

(76) WELDING TORCHES—New 36-p catalog covering the complete line of Airco torches and tips for oxyacetylene cutting and welding provides full information on every Airco standard torch and tip, along with the necessary mixers, extensions, adapters and accessories used with the torches. Form ADC 702B, from Air Reduction Sales Co., New York 17.

(77) A WATERSTOP that is installed after concrete is placed is described in a folder, "IGAS Joint Sealer," offered by Sika Chemical Corp., Passaic, N. J. It discusses a non-meltable mastic material which, the maker says, can durably seal joints subject to severe movement and pressure, between materials such as concrete to concrete, concrete to steel and even concrete to glass.

(78) CHAIN DRIVES—Revised 16-p Catalog C72-51 covering Morse "Hy-Vo" high-speed heavy-duty chain drives is available from Morse Chain Co., Detroit 10, Mich. Operating principles and test data are included for drives that will carry up to 190 hp per inch of chain width at continuous chain speeds up to 6,000 fpm.

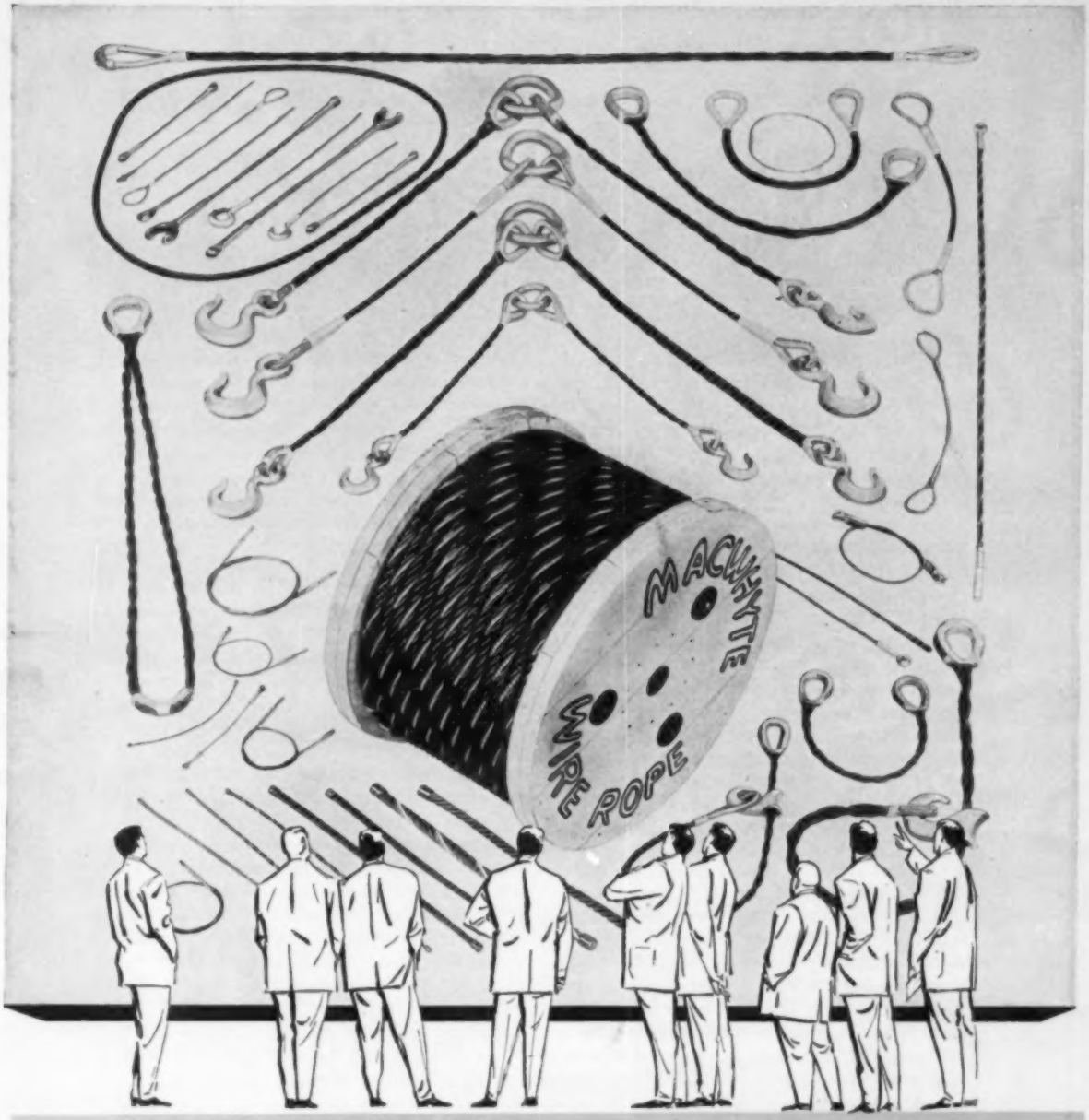
(79) CARBON-STEEL ELECTRODES—12-p reprint entitled "Carbon-Steel Electrodes for Use With Inert Gas Shields," is a study of the properties of electrode weld deposits, for production use in the welding of carbon steel by the inert-gas-shielded metal-arc process. From Air Reduction Sales Co., New York 17.

(80) SHELVING, ETC.—New catalog covers various new items as well as Precision's standard line of steel shelving, lockers, ladders and other storage and maintenance equipment, with descriptions and prices. Precision Equipment Co., Chicago 41.

(81) MACHINERY PROTECTION—Bulletin SP-1 from the A & A Mfg. Co., Milwaukee 3, Wis., illustrates 14 of the many pliable Gortite sleeves, boots, way-protectors and covers fabricated from two or more weights of neoprene-base materials to meet specified operation conditions for various types of machinery.

(82) POWER TRANSMISSION — Bulletin from the American Pulley Co., Philadelphia 29, covers its complete line of power-transmission equipment, with brief descriptions of the features and applications of its "Wedgbelt" drives, "Shaft-King" speed-reduction drives, adjustable-speed sheaves, steel split pulleys, conveyor pulleys, "Econ-O-Matic" motor bases, "Hi-Torque" pulleys, collars and shaft hangers.

(83-84) FANS & BLOWERS—Chicago Blower Corp., Franklin Park, Ill., offers Bulletin MD-101 with detailed specifications and data on its line of MD fans, which are V-belt driven standard and heavy duty fans recommended by the maker for commercial, office or public building use. Bulletin CTB-103 provides data on its line of turbo-pressure blowers designed to furnish air at high pressures for various industrial uses. Circle 83 on the postage-free card for Bulletin MD-101; circle 84 for Bulletin CTB-103.



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THE ABC SYMBOL, which appears at the head of this page, is your brand—the reader's brand—on this magazine. It stands for Audit Bureau of Circulations. It means that this magazine will stay in business only so long as it continues to serve its readers to their satisfaction.

That Bureau—known for short as ABC—is a voluntary, nonprofit, cooperative association founded in 1914 by a group of publishers, advertisers and advertising agencies who wanted to establish and maintain higher standards of publishing practices than then prevailed. Its primary and specific purpose was to set up yardsticks to appraise circulation values and to verify the claims of publishers as to their circulations. For the buyer of advertising space this provides an effective means to take some of the guesswork out of buying and to reconcile the conflicting claims of competing publishers. BUSINESS WEEK magazine has aptly described ABC as "the publisher's conscience—and cop."

BUT IN DOING that job, ABC performs another function of high importance to the readers of ABC member publications. It provides a constant pressure on the publishers to keep alive in their staffs a sense of primary responsibility to their readers. That is because the most simple and direct method of making a publication responsible to its readers is to place upon it a purchase price, whether by subscription or newsstand purchase. The right to purchase or to refrain from purchasing a publication gives to the reader and to no one else the power to pass effective judgment on the publisher's success in serving the reading public. Each paid publication will grow or languish, will prosper or fail, in proportion as it wins or loses the following of thousands or millions of readers. The readers, by their patronage, record their judgments as to whether the publisher and his publication are measuring up to their responsibility to them.

And that is where the ABC comes into the reader's picture. The newspaper or magazine that carries the ABC symbol on its masthead must in the first place be a paid circulation publication. Moreover, it must conform to the high standards set up by the Bureau as to terms of payment and accounting methods. And again it must open all of its books to the auditors of the Bureau on demand.

SINCE THE INFORMATION thus determined by thorough and impartial audit is periodically made public through the ABC statements and audit reports, it is constantly available to and universally used by advertisers who are considering the purchase of space in an ABC publication. These reports show the circulation trend, as verified and certified by ABC, and thus put the advertisers in a position to know whether or not the publisher is rendering satisfactory service to his readers.

Thus the publisher who submits his publication to the supervision and discipline of ABC affirms in the strongest possible manner that he recognizes his primary obligation is to his readers and that he owes his standing to a voluntary demand by those readers. It follows that the editors of ABC publications must be exceptionally alert to the desires of their readers and responsive to their needs, since any decline in circulation will soon show up in the ABC statements and audit reports.

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Lubricated for Almost 2 Years

without changing
or adding grease!

with **BROOKS**

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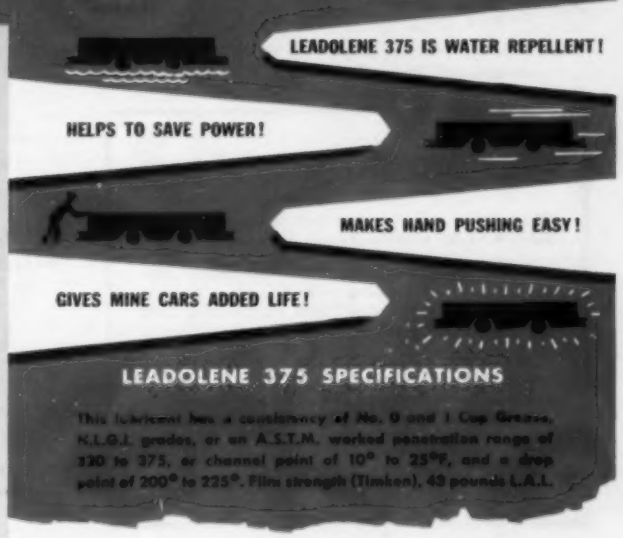
A large mine in Western Pennsylvania tested *Leadolene 375* in the roller-bearing wheels of an 8 ton capacity steel mine car. At two month intervals, a wheel was removed and inspected. At the end of *22 months* a few ounces of the lubricant remained in the housing and the roller bearings were in perfect condition. No grease was added!

This test was made under actual mine operating conditions—with the car being subjected to regular coal mine loading and transportation practice. It is an outstanding achievement for Leadolene 375, since it has been customary to grease mine car wheels every six months, with other lubricants.

Investigate the savings made possible with Leadolene 375 in lubricating roller bearings in *your* mine car wheels. Write our nearest sales office today!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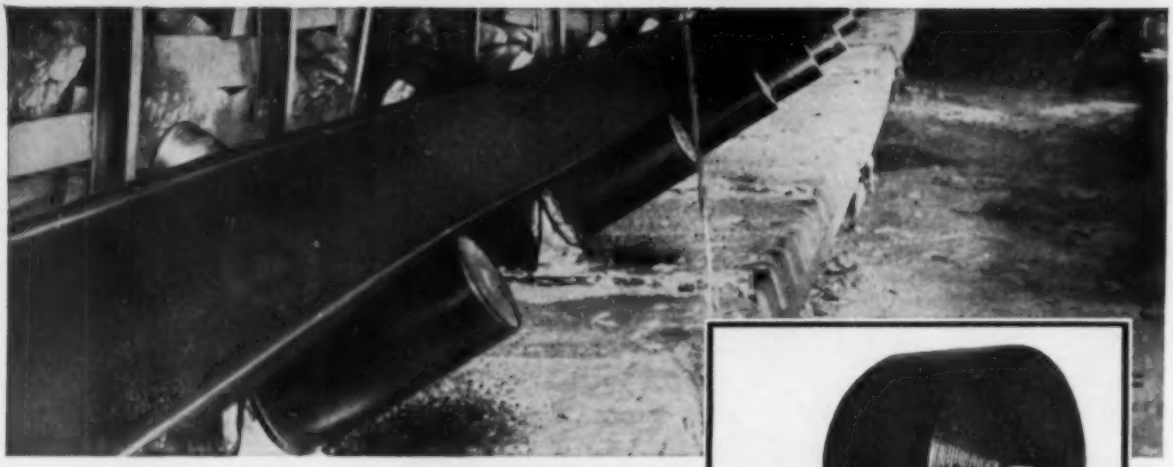

*Top photo shows Face Conveyor in British coal mine. Inset shows roll of SCANDURA.

NEW SCANDURA

the original P.V.C. coated CONVEYOR BELTING

eliminates big FIRE HAZARD in mining operations

One of the great hazards of mining—fire caused by a belt stalled over a still-rotating driving drum—is eliminated by new SCANDURA BELTING .... the original P.V.C. Coated Conveyor belt which was developed in the United Kingdom and now manufactured by us in our Charlotte, N. C. plant.

LET'S LOOK AT THE RECORD!

About 12% of coal mining fires in the past several years have been attributed to conveyor-belt friction.

At the 1953 annual meeting of the Illinois Mining Institute, data was presented to show that the majority of belt fires result from stalled belts while the driving pulley continues pulling.

In the tragic Evanston, Ky. fire in which 4 men lost their lives, fire was reported to have had its origin in the friction caused when a foil stopped the belt, while the drive motor continued to operate.

This record clearly points to the great need for SCANDURA BELTING!

Other unique SCANDURA features:

- *Withstands abrasions that would ruin other belts.*
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- *Works in temperatures ranging from 22° below to 212° above.*
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NEWS ROUND-UP

News Briefs and Trends

Cabinet Group Names Task Force to Study Coal and Fuels

A 3-man "task force" to study the bituminous coal industry and other problems of energy and fuel supply was named Sept. 20 by Arthur S. Flemming, Mobilization Director and chairman of the Cabinet Committee of Energy Supplies and Resources appointed by President Eisenhower last July. Selected to head the new group was James F. Brownlee, a partner in J. H. Whitney Co., New York, and a director of several food corporations. Dr. Charles T. Potter, president of the Rochester & Pittsburgh Coal Co., Indiana, Pa., will be responsible for the coal studies, and John Ed. Warren, vice president of the National City Bank, New York, will supervise the research on oil and gas.

Pitt-Consol Offers $10 Million For Jamison C&C Properties

George H. Love, president of Pittsburgh Consolidation Coal Co., Sept. 4 confirmed that his company has submitted an offer to purchase Jamison Coal & Coke Co., Greensburg, Pa., for a cash consideration of approximately $10 million. The Jamison properties include the Jamison No. 9 mine on the B&O R. R. in northern West Virginia, an up-to-date mine with a modern preparation plant and approximately 8,500 acres of Pittsburgh seam coal. Mr. Love said that the offer was prompted by the need to replace Pitt-Consol production capacity along the B&O. "Just during the past 3 yr," Mr. Love said, "three of our B&O mines, which formerly produced 1,400,000 tons annually, were worked out. The Jamison mine, which produced just over 1 million tons in 1953, would partially replace these exhausted properties. The acquisition, if consummated, would thus give us a long-life operation where most needed and enable us to maintain continuity of service to long-time customers in the areas reached by the B&O." According to reports, Jamison stockholders were scheduled to vote on the proposal during the latter part of September.

Strip-Mine Hogs Score At 1954 Indiana Fair

First prize for senior yearling Hampshire boar at Indiana's 1954 State Fair went this year to a 770-lb entry reared on reclaimed strip land by Meadowlark Farms, Inc., farm agent for Ayrshire Collieries Corp.'s extensive spoil land reclamation work.

Hogs raised on Meadowlark spoil land also placed high in other competition during the fair. A Meadowlark boar was the senior yearling reserve champion. A pen of Meadowlark barrows was acclaimed reserve champion among all breeds. In the class of senior boar pig, a Meadowlark entrant placed third out of a class of 65 prize hogs from the Midwest states. On junior boar pig, Meadowlark placed second out of a class of 60.

Also in This Section

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New Preparation Facilities .. p 162
New Books for Coal Men ... p 164

Shipping Coal Abroad Approved by President

Government plans to ship 10,000,000 tons of American coal abroad were approved by President Eisenhower Sept. 21. Following a talk with the President, Harold Stassen, director of the Foreign

Continued on p 166

Coal Royalties and Reserves Up, 1954 UMWA Fund Report Shows

Reserves of the UMWA Welfare and Retirement Fund rose by $1,540,312 during the fiscal year ending June 30, 1954, according to the Fund's annual report released Sept. 1. Receipts for the year totaled $134,847,779, while expenditures were $133,307,466, leaving an unexpended balance in the Fund on June 30 of $93,565,044. During the 1953 fiscal year total receipts and expenditures were $131,482,787 and $138,963,950, respectively.

Despite lowered production in the coal industry during the year, the year-end balance showed an increase over that of June 30, 1953, which was $92,024,732. The 1954 fiscal year was the first 12-mo period during which royalties were paid at the rate of 40c a ton. Royalties paid by operators during the year just ended totaled $132,368,801, as compared with $129,690,366 received during 1953.

Benefits paid miners and their families during the year amounted to $129,296,261, with only 3% of the total expenditure for the year, or $3,973,039, going for administrative expenses. Some 276,763 persons received benefits in the 12-mo period.

As of June 30, pension payments were being paid to 54,937 retired miners and total pension payments for the year added up to $64,092,309. In the previous year, pension payments amounted to $58,945,707 and 50,055 miners were on the pension rolls as of June 30, 1953. The report showed that 53% of the 7,130 miners who retired during the past fiscal year did so because no further work in the mines was available for them, while 37% applied for physical disabilities.

Widows, orphans and other dependents received a total of $7,524,684 in cash benefits during the year. Funeral expense and survivors benefits of $3,069,277 were paid to 3,768 families and additional aid of $4,395,373 in cash was paid to assist 24,150 widows and orphans. This latter type of temporary benefit was discontinued by the trustees as of April 1, 1954, as was the cash assistance to disabled miners which totaled $5,469,354 in the fiscal term. Disaster benefits of $60,033 were paid to 521 widows and orphans of 245 miners killed or gravely injured on the job.

The hospital and medical care provided by the Fund totaled $52,209,912 in the year ending June 30, providing 2,058,130 days of hospitalization for 115,274 patients in 1,739 hospitals located in 45 states, the District of Columbia and Alaska.

A summary of the Fund's operations since the start of the welfare program in 1946 also was shown in the report. During the 8-yr period, total revenues were $753,196,122. Pensions accounted for the largest slice of expenditures, or $260,027,905; hospital and medical care, $203,479,715; cash aid to disabled miners, $105,006,474; and cash benefits to widows, orphans and survivors, $72,781,972.

Throughout the entire 8 yr, only 2.8% went for overhead, or administrative costs. Since the Fund was established in 1946, benefits paid out total $641,296,068. Almost a million miners or their dependents have shared in the 1,843,779 benefits distributed, the report shows.

Philadelphia Electric to Build World's Greatest Power Plant

The world's largest steam turbine generator unit will be installed in the world's most efficient power generating station to be built by Philadelphia Electric Co., it recently was announced by R. G. Rincliffe, company president. Representing an initial investment of some $45 million, the projected power generating station will establish new "highs" for efficiency, steam pressure and temperature and will add more than 10% to Philadelphia Electric's present generating capacity. Work on equipment for the new station is to begin at once, but the site for its location is yet to be determined.

The 275,000-kw turbine generator unit —the largest ever ordered—will be built by the Westinghouse Electric Corp. The steam generator for the plant will be built by Combustion Engineering, Inc., and will supply steam to the turbine at the highest steam pressure and temperature of any existing or projected power plant in the world, 5,000 psi and 1,200-deg F, although initial operation will be at 1,150 F.

In discussing the unique engineering features of this unit, K. M. Irwin, Philadelphia Electric's vice president in charge of engineering, explained that the expected plant heat rate for steam conditions of 5,000 psi and 1,150 F is 8,400 Btu per kw-hr, some 600 Btu less than the heat rate for the most efficient existing power station.

If the new unit were used to produce current for home use only, it would be large enough to supply the electrical needs of more than 3,000,000 people.

The steam generator incorporates, for the first time in this country, the monotube principle of the internationally-known Swiss Sulzer Co., for which Combustion Engineering holds American rights. The boiler will be equivalent in size to a 14-story building 100 ft wide by 75 ft deep. It will contain more than 150 mi of tubing. The pipes, which will deliver steam to the turbine at 5,000 psi, will have an inside diameter of only 6 in. The heat of the steam, at 1,150 F, will heat the outer surface of this piping to a cherry red.

The twin furnaces could heat approximately 25,000 medium-size homes. At full capacity, the furnace will burn about 100 tons of pulverized coal an hour. It represents the most advanced thinking and practice in power generation, not only in this country but in Europe as well, company officials point out.

PEABODY SAFETY STUDENTS AND TEACHERS—Left photo: John Burke, Illinois mine inspector; Walter Kessler and Branch Beck, USBM; W. J. Williams, Peabody mine-rescue superintendent; John Kotzman, Illinois mine inspector; T. A. Scully, inspector, and R. W. Whittekar, mining engineer, USBM. Right photo: John Lohman (left) and Marcell Pallai, safety committeemen, Mine No. 10; Felix Shimkus, president, UMWA Local 9819; L. H. Johnson, Peabody safety engineer; Hugh White, president, UMWA District 12; and Fred Hanlon, safety committeeman, Mine No. 10.

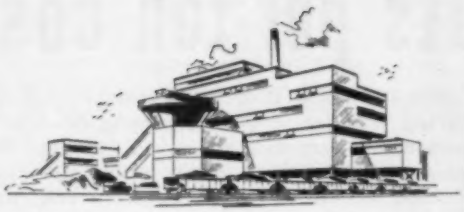
Peabody No. 10 Achieves 100% Accident Training

OTHER PARTICIPANTS in ceremonies included John Carney (second from left), superintendent, Peabody No. 10 mine, and E. E. Quenon (right), chief, Vincennes Branch, USBM, shown with Mr. Shimkus (left) and Mr. Johnson.

MINE No. 10, Peabody Coal Co., Pawnee, Ill., in August marked completion of 100% training in accident prevention and mine safety for 576 mineworkers and 66 company men. Completion of the training was celebrated with a dinner at the Peabody Club, Kincaid, and presentation of certificates from the U. S. Bureau of Mines, the Illinois Department of Mines & Minerals and the UMWA.

Instructors for the 20-hr course were: W. R. Whittekar, Alvin Scully and Walter Kessler, USBM; John Kotzman, W. J. Williams and Albert Morris, Illinois Department of Mines & Minerals; and L. H. Johnson, safety engineer, Peabody Coal Co. Taking leading roles in the ceremonies were O. Gressens, Peabody president, and Joe Craggs, Peabody's field superintendent of operations.

Peabody No. 10 is the 150th mine in the Nation to be trained 100%. Plans now are under way for achieving 100% training at the company's Mine No. 17, Pana.



"Solved... The problem of Cold Morning Starting"

On a regular call at one of the most modern coal processing plants, Sinclair Lubrication Engineer J. R. Scheidker was confronted with a common—but costly problem.

20 Minutes Warm-up Needed for Vibrator

Mr. Scheidker reports, "The problem was how to reduce the time required in getting the tipple in full operation on near zero degree mornings. The shake-out vibrator required 20 minutes running time to attain full operating speed. Starting the 1225 ft. conveyor belt caused even greater production delays.

Operating Speed Quickly Reached

"Sinclair LITHOLINE® INDUSTRIAL #0 GREASE was my recommendation for the shake-out bearings and for the conveyor roller, idler and shaft bearings. Result—the plant reached full operating speed quickly on the coldest mornings. *Moreover, power consumption and wear were reduced.*"

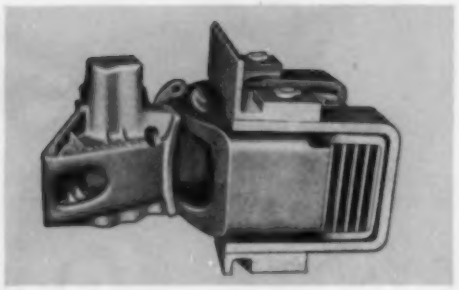
Why not give a Sinclair Lubrication Engineer the opportunity to help solve *your* lubrication problems? There's no obligation. Contact your local Sinclair office or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR LUBRICANTS

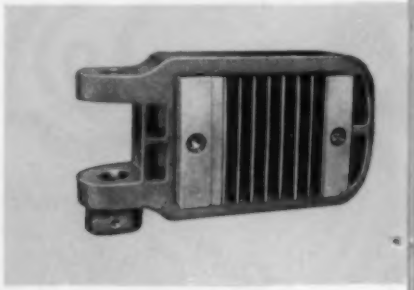
NATIONAL equipment cuts per-ton costs

NC-1 MINE CAR TRUCK is the latest example of National's pioneering in better equipment. Among NC-1 truck advantages are longer and softer ride springs, friction damping mechanism that controls vertical and transverse oscillations, automatic frame alignment and cast one-piece bolster with large lubricated center bearing. A-9021

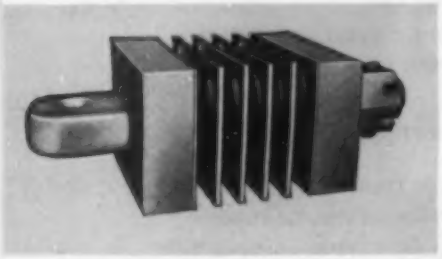
WILLISON AUTOMATIC COUPLERS save time with maximum safety, couple at either end of car or locomotive, require no manual assistance, eliminate damaging slack, permit high speeds with maximum stability.



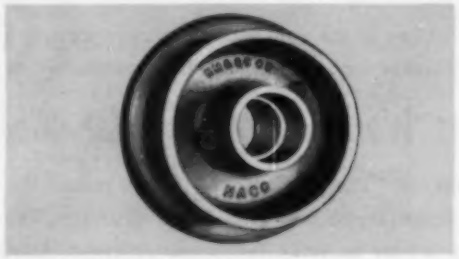
NATIONAL MI-235 Rubber-Cushioned Draft Gear primarily used in Willison spherical-horn coupler assemblies for drop-bottom cars and locomotives; are effective with link and pin bumpers and in strap yokes.



NATIONAL MI-225 Rubber-Cushioned Draft Gear for locomotives and large capacity cars not required to operate through rotary dump. Give maximum impact protection in minimum space.



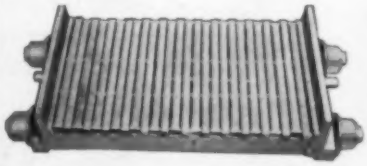
NATIONAL MI-230 Rubber-Cushioned Draft Gear for cars in rotary dump service. High-capacity rubber pads with soft initial action provide maximum impact protection, lengthen equipment life. Available in capacities and designs to fit individual requirements.



NACO STEEL WHEELS, made from quality-controlled Naco cast steel—of high yield point, great tensile strength and ductility—reduce tread spalling or flange breaking. Available in all sizes regularly used in mining or industrial operations.

NACO STEEL SWIVEL HITCHING AND LINK

CAST ALLOY STEEL ORE-GRINDING BALLS



CAST STEEL PALLET AND MALLIX SINTERING BARS

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Personal Notes

West Virginia Coal & Coke Corp., Cincinnati, Ohio, announced two changes in management following a meeting of the executive committee held Sept. 15. **Morris Creditor,** executive vice president, was elected president and a member of the executive committee, succeeding **T. G. Gerow,** resigned. Mr. Creditor also is president of The Ohio River Co., a wholly owned subsidiary. **A. H. Crane,** vice president, was elected executive vice president of West Virginia Coal & Coke and vice president of The Ohio River Co.

The New River Co., Mt. Hope, W. Va., recently announced the following changes in personnel: **M. E. Gillespie,** superintendent for the company's Skelton and Oswald mines, has been named superintendent of Stanaford No. 1 mine, succeeding the late **E. M. Beasley.** Mr. Gillespie also retains the superintendency of the Skelton operation. **John Davis,** general mine foreman, has been named superintendent of the Oswald mine. **O. B. Collins,** superintendent, Whipple mine, since 1952, has been named superintendent of the Oakwood mine. New River Co. also announced the retirement of **Clarence F. Bloch,** ventilation and drainage engineer, on the company's retirement pension plan. An engineering graduate of VMI, Mr. Bloch served the company for 32 yr.

ASME to Honor Hughes

Robert H. Hughes, president of Clinchfield Coal Corp., Dante, Va., has been named to receive the Pi Tau Sigma Richards Memorial Award. The award, which is administered by the Board of Honors of the American Society of Mechanical Engineers, is conferred annually on a mechanical engineer, 45 yr of age or younger, for "outstanding achievement in mechanical engineering within 20 to 25 yr after graduation." It will be conferred at ASME's annual meeting in New York, Nov. 29-Dec. 3.

Following his graduation with a BS degree in mechanical and electrical engineering from Clemson A & M College in 1932, Mr. Hughes joined the staff of the Fairforest Finishing Co., Spartansburg, S. C., as a mechanical engineer in maintenance and combustion work. He began his association with Clinchfield Coal 3 yr later in 1935. Starting as a fuel engineer, Mr. Hughes served successively as assistant chief engineer, chief engineer, vice president and president of the company. He has had wide experience with engineering work on preparation plants, mine layouts, maintenance of equipment and standard costs.

Mr. Hughes served with the Signal Corps during World War II, rising from the rank of first lieutenant to lieutenant colonel. All but 7 mo of his 4-yr service was spent in the European Theatre of Operations, where he was a member of the staff of the Chief Signal Officer, and was officer in charge of Signal Corps Maintenance for the entire ETO.

Roy W. Fox, consulting engineer, has been elected vice president and director of North American Coal & Dock, and Powhatan Mining Co., succeeding the late **Earl F. Maurer. R. A. Maurer,** former assistant to the president, has been appointed superintendent, East Gulf mines, C. H. Mead Coal Co., Div. of North American Coal & Dock Co., succeeding **J. W. Hurley,** who continues as vice president of production for North American's southern mines. **Michael Yonko** has been promoted from superintendent, Powhatan No. 1 mine, to general manager of Powhatan's three deep mines. **James H. Hurley** has been named general mechanization foreman, East Gulf mines.

Several changes in personnel of the W. Va. Department of Mines were announced last month by Frank B. King, chief of the department. **M. G. Dobbie,** of Fairmont, has been advanced to administrative assistant in charge of strip mining, with offices in Morgantown. Named to succeed Mr. Dobbie as mine inspector for the northern division was **Leslie Ryan,** associated with the Maiden mine of the Valley Camp Coal Co. since 1940. **James S. Querry,** section foreman with the Cannelton Coal & Coke Co. for the past 14 yr, has been appointed district inspector in the Kanawha division, replacing **Julian P. Arbaugh,** resigned.

Eric H. Reichl has been named director of the Research and Development Div. of Pittsburgh Consolidation Coal Co., it was announced Sept. 22 by Joseph Pursglove, Jr., vice president. Mr. Reichl succeeds **Howard S. Turner,** named vice president-research and development, Jones & Laughlin Steel Corp. A graduate of the Polytechnic Institute of Vienna, Mr. Reichl jointed Pitt Consol in 1948 following association with various American firms and was promoted to research manager for the company shortly thereafter.

Pennsylvania Coal Co., Scranton, Pa., has announced the appointment of **Willmon Keiser** as general superintendent. Mr. Keiser had been superintendent of the company's electrical and maintenance departments. **L. H. Leitner,** superintendent, Ewen colliery, Pennsylvanian Coal Co., retired last month after 44 yr of service with the company. Joining the company in 1910 in the engineering department, he became assistant foreman, Underwood colliery, was named inside foreman there in 1945, and was promoted to his present position in 1950.

Marvin E. Hall, former federal mine inspector, has been appointed superintendent, Blue Pennant mines, Glogora

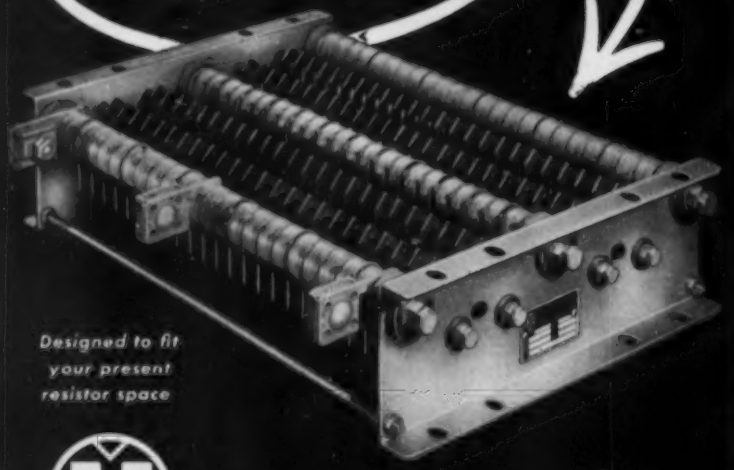
Red Jacket Stages Annual Safety Day

THE TEAM FROM RED JACKET MINE took top honors in mine rescue and the team from Keen Mountain took first place in first aid at the annual Family Picnic and Safety Day staged Aug. 21 by Red Jacket Coal Corp., Red Jacket, W. Va.

The day-long program included, besides first-aid and mine-rescue contests, two showings of the new USBM film on shuttle-car operation, music and entertainment, and special contests aimed at promoting safety among men and women, boys and girls. J. J. Plasky, Red Jacket's director of training and safety, shared speech-making with Charles Ferguson, director, Safety Div., UMWA. Prizes were awarded by J. J. Benson, safety director, Southern Coal Producers' Association; Charles Kiser, district representative, UMWA; and Young Lawson, inspector-at-large, W. Va. Department of Mines.

National safety experts and company officials shown watching the safety contests (above) are: Front row: James Westfield (left), chief, Health & Safety Div., USBM; Charles Ferguson, safety director, UMWA; Charles Kiser, UMWA district representative; W. M. Ritter, president, and R. A. Ison, assistant to the president, Red Jacket Coal Corp. Back row: Young Lawson (left), W. Va. Department of Mines; J. J. Plasky, training and safety director, Red Jacket Coal Corp.; W. A. Fullarton, assistant to the president, Pocahontas Fuel Co.; W. H. Tomlinson, chief, Region VIII; USBM; and Pete Senio, USBM motion-picture specialist.

RUGGED
all the way thru!



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P-G STEEL GRID RESISTORS
consistently prove their value in
MINING SERVICE

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- Provision for Expansion
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By use of these durable raw materials . . . steel and mica, and the P-G exclusive features of design, these steel grid resistors have the "built-in quality" to overcome factors which often cause resistor failures. Vibration, moisture laden or corrosive atmospheres have little effect on continuity of service. Try Post-Glover Resistors for heavy duty applications where resistors are subject to severe service . . . continuous "Trouble-Free" performance is assured.

P-G *The Nonbreakable Steel Grid Resistor*

THE POST-GLOVER ELECTRIC COMPANY
ESTABLISHED 1892
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MEETINGS

Stoker Manufacturers' Association: Annual Meeting, Oct. 15, La Salle Hotel, Chicago.

National Safety Council: 42nd National Safety Congress and Exposition, Oct. 18-22, Conrad Hilton, Congress, Morrison and La Salle hotels, Chicago.

Kanawha Coal Operators' Association: Annual Meeting, Oct. 21, Charleston, W. Va.

Northern West Virginia Coal Association: Annual Meeting, Oct. 26, Fairmont, W. Va.

West Virginia Coal Mining Institute and Central Appalachian Section, AIME: Joint Meeting, Nov. 5-6, Homestead Hotel, Hot Springs, Va.

Kentucky Mining Institute: Annual Meeting, Nov. 11-12, Phoenix Hotel, Lexington, Ky.

Illinois Mining Institute: Annual Meeting, Nov. 12, Hotel Abraham Lincoln, Springfield, Ill.

National Coal Association: Annual Meeting, Nov. 17-18, Hotel William Penn, Pittsburgh, Pa.

Coal Exporters' Association of U. S., Inc.: Annual Meeting, Nov. 17, Hotel William Penn, Pittsburgh, Pa., in conjunction with NCA Convention.

AMC, Coal Div.: Meeting, Nov. 18, Hotel William Penn, Pittsburgh, Pa.

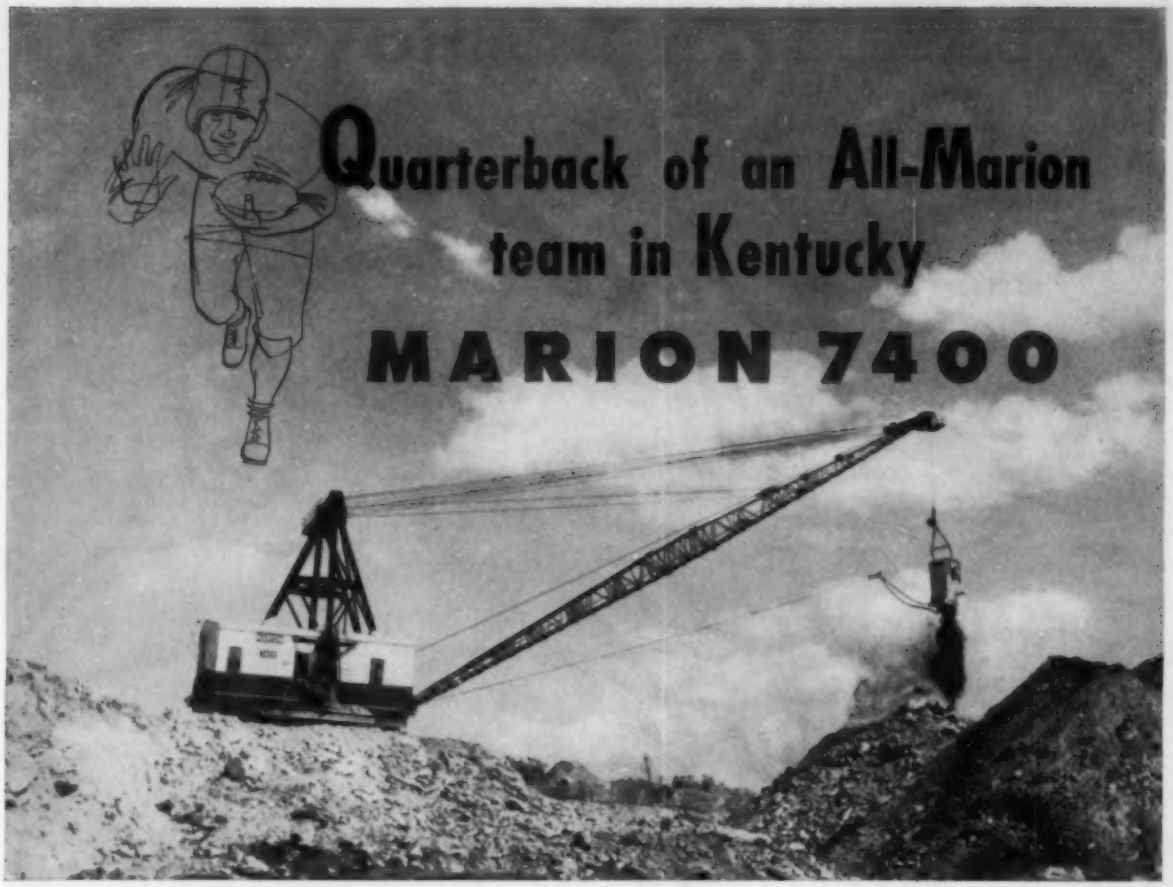
ASME: Annual Meeting, Nov. 28-Dec. 3, Hotel Statler, New York City.

Coal Co., Whitesville, W. Va., succeeding the late Frank Hughes. Mr. Hall, who has 33 yr of coal mining experience, began his career at the age of 15 at Pocahontas Fuel Co., working his way up to general mine foreman until 1946 when he was appointed a federal mine inspector. After a year with the Bureau, Mr. Hall returned to Pocahontas Fuel as assistant superintendent, rejoining the Bureau in 1949. In 1952, Mr. Hall became part-owner of the B. & H. Coal Co., and later organized the Sport Coal Co. In 1953, he again returned to the Bureau, resigning in August to join Glogora.

Obituaries

William W. Sloane, vice president in charge of engineering, Goodman Mfg. Co., Chicago, died Sept. 8. With Goodman since 1911, Mr. Sloane was appointed chief engineer in 1937 and was made a vice president in 1945. At Goodman, he was responsible for many of the progressive machine designs for promoting the mechanization of underground mining operations.

Thomas Warner Guy, widely known coal preparation engineer, died Sept. 11 in St. Francis Hospital, Charleston, W. Va. He designed and supervised construction and operation of numerous coal production plants, developing improved methods for handling and preparation



FIVE MARION MACHINES IN BUSY COAL MINE

The MARION 7400 Walking Dragline pictured above, swinging a 12½ cubic yard bucket on a 175-foot boom, handles most of the stripping for a busy Kentucky coal mine. Its production, even in hard sandstone, is impressive.

Two MARION 151-M Shovels, a MARION 93-M Coal Loader and a MARION 362 complete the team of MARION equipment at work in this busy mine.

Whatever your stripping, loading or material handling problem may be, you'll find that MARION offers (1) an unmatched range of types and sizes of equipment from which to select exactly the right machine for your work and (2) that MARION quality and attention to details in the design and construction of machines pay big dividends to owners.

Why not invite MARION to review your equipment requirements today?

MARION POWER SHOVEL CO.

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OFFICES AND WAREHOUSES

from 1 to 60 cu. yds.

IN ALL PRINCIPAL CITIES

OSGOOD-GENERAL, a subsidiary, manufactures excavating machines from ½ to 2½ cu. yds., truck cranes from 15 to 25 tons, mobilcranes from 25 to 45 tons, and log loaders.

CONVERTED GOODMAN 460 or 360 LOADER
CONVERTED GOODMAN 324 CUTTER
CONVERTED JEFFREY 29U CUTTER
for Economy...
CONVERT NOW from TRACK to TRACKLESS
"TRACKLESS MINING" with conventional cutters, loaders and shuttle cars provides the most economical and efficient mining system available today.
These trackless advantages are yours by having your track-mounted cutters and loaders converted to trackless operation - Lee-Norse "conversions" that result in greater savings to you through . . .
• Lower investment compared with new mining machines.
• Very little increase in spare parts inventory.
• Converted machines are well-known to your operators and maintenance men - no need for re-education.
• Lost time for conversions minimized.
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Lee-Norse Company
Specialists in Coal Mining Equipment
CHARLEROI, PA.
Write today for complete facts on converting your track mounted equipment.

of coal. Mr. Guy was for many years active in the affairs of the American Mining Congress Coal Preparation Committee, and for 5 yr served as chairman of the group. Prior to opening an engineering office in Charleston in 1929, he was chief engineer of Clinchfield Coal Corp. from 1911 to 1917, and following service in World War I, was chief engineer and then general superintendent, Boone County Coal Corp.

Robert Boyd, 78, president of the Boyd Excelsior Fuel Co. until his retirement 2 yr ago, died Aug. 21, in a Fort Smith, Ark., hospital. Mr. Boyd, formerly served as a mine inspector and as superintendent of the Central Coal & Coke Co.

Arthur M. King, 84, for 50 yr a civil engineer for Lehigh Valley Coal Co., died Aug. 27 at Wilkes-Barre General Hospital, following a brief illness.

Salesmen Learn Combustion

TWENTY-EIGHT SALESMEN of industrail coal completed Aug. 20 a 2-wk course in combustion engineering at Purdue University, Lafayette, Ind. This second annual offering of the course, sponsored by American Coal Sales Association, attracted men from nine states and two provinces of Canada. Earlier in the summer, at Penn State University, other salesmen completed a similar course under ACSA auspices.

At both universities, salesmen were instructed in the fundamentals of properties and analyses of coal, combustion and furnaces, fuel performance, coal- and ash-handling, air pollution and competitive fuels. Instruction took the form of lectures, discussion and problems, supplemented by inspection trips to nearby power plants.

In the photo above, Prof. Fred Morse (left) gives students an on-the-spot demonstration of traveling-grate stoker operation at the Purdue University power plant. Others in the picture are: R. H. Ritter, Virginia Smokeless Coal Corp., Wyandotte, Mich.; W. S. Chase, Southern Coal Co., Inc., St. Louis, Mo.; R. W. Kirkpatrick, Amherst Fuel Co., Birmingham, Mich.; and J. J. Fleming, Virginia Smokeless Coal Corp., Cincinnati, Ohio.

Motorists: here's proof...

Gulf's cleaner-burning, super-refined gasoline solves today's No. 1 engine problem!

This lamp is burning the "DIRTY-BURNING TAIL-END" of gasoline which GULF refines out
This lamp is burning NEW SUPER-REFINED GULF NO-NOX, the cleaner-burning super-fuel

Laboratory tests promised...

. . . these *immediate* and *lasting* benefits from this new, super-refined fuel:

More complete engine protection than from the so-called "miracle-additive" gasolines. Why? Because Gulf refines *out* the "dirty-burning tail-end" of gasoline (the No. 1 troublemaker in high-compression engines)—and then treats this new Super-Refined NO-NOX to give it a *complete range of protective properties*. It protects *every* part it touches against carbon, rust, gum.

Extra gas mileage in all your everyday, short-trip, stop-and-go driving.

No knock, no pre-ignition. Why? Because the anti-knock power of new Gulf NO-NOX has been stepped up to an all-time high.

Stall-proof smoothness. Instant *starts*, too—and fast, fuel-saving warm-up.

That's why new Super-Refined Gulf NO-NOX gives your engine more power-with-protection than you've ever known.

Road tests proved...

These cars, powered by New Gulf No-Nox, actually performed better than new . . . after 15,000 miles!

True! After 15,000 miles per car—covering all conditions of city and country driving—Gulf test cars showed these results:

- Higher-than-new horsepower!
- Better-than-new on gasoline mileage!
- And not a single trace of carbon knock or pre-ignition at any time—even on the steepest mountain grades!

COMPLETELY NEW! SUPER-REFINED

New Gulf No-Nox

THE HIGH-EFFICIENCY GASOLINE

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JUST "CLEANING UP"

KING STRIP DETONITE BLASTED THE WAY

King Strip Detonite is packed in convenient cartridges suitable for all loading conditions.

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So I can see for myself, have your representative get in touch with me to arrange a King Strip Detonite demonstration at my mine.

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It's a cinch for your big shovels to clear away overburden once King Strip Detonite has reduced it to sizes that are easy to handle. Your equipment works faster and with less strain. That means you get the double benefits of *increased* production and *decreased* maintenance from King Strip Detonite.

HERE'S WHY: King Strip Detonite is a surface-sensitized stripping explosive, designed especially to shoot overburden with greatest economy. It has a slow, heaving action that lifts and fully displaces the overburden — without shattering and pin-cracking the coal.

TO PROVE IT . . . We'd like to give you a demonstration of King Strip Detonite's remarkable action right on your job under your own operating conditions. Mail the coupon or phone today.

DETONITE

PATENTED SURFACE-SENSITIZED EXPLOSIVE

Since 1878—Our 76th Year

THE KING POWDER CO., INC.

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EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in August, as follows:

Goodman Mfg. Co.—Type 570-48 cable-reel shuttle car; two 15-hp and one 10-hp motors, 250 v, DC; Approval 2-1015; Aug. 2.

Joy Mfg. Co.—Types USCPE-1 and USCPXE-1 cable-reel shuttle cars; two 10-hp and one 15-hp motors, 250 v, DC; Approval 2-1016; Aug. 6.

Lee-Norse Co.—Type TJIP-2J utility truck; one 5-hp motor, 90 v, DC; Approval 2-1017; Aug. 11.

The Long Co.—Type 601HE elevating conveyor; one 15-hp motor, 250 v, DC; Approval 2-1018; Aug. 30.

New AGE Plant to Use 600,000 Tons Annually

Plans for further expansion of the American Gas & Electric Co. System by the construction of a 225,000-kw steam-electric generating unit were announced Sept. 23. To cost an estimated $26,400,000, the unit will be an addition to the Glen Lyn plant of the Appalachian Electric Power Co., an AGE subsidiary, located on the New River at Glen Lyn, Va., in the western Virginia panhandle. "The new unit will burn an additional 600,000 tons of coal per year, all of which will come from producers in the Glen Lyn area," said Philip Sporn, AGE president. It will be the sixth of a series of 215,000-kw or slightly larger machines on the seven-state AGE System. Four of these units, the only high-pressure units of this capacity operating anywhere in the world today, have been placed in service in the past 15 mo, and the fifth is scheduled for operation in about 2 mo. The new unit, to be completed in about 2 yr, will be among the world's most efficient electric power producers, operating at a steam pressure of 2,000 psi and at a steam temperature of 1,050 F. It is expected to produce a kilowatt-hour of electric energy from about 0.7 lb of coal.

Campbell Stoker Sales Approach 1,000 Mark

Nearly 600 homes now are equipped with the Campbell stoker and the number is expected to exceed 1,000 before the end of the year, according to officials of Automatic Solid Fuels Equipment, Inc., New Albany, Ind. The Campbell stoker, a new type of bin-feed, automatic-ignition heating unit for residences, was introduced about 9 mo ago by ASFE, a manufacturing and merchandising organization sponsored by American Retail Coal Association, local retail organizations and coal producers' associations. Retail coal dealers, who are handling most sales of the Campbell unit, report that the new-type stoker has replaced equipment burning competitive fuels in a number of homes.

STOP Pumping Troubles
CUT Maintenance Costs
AVOID Costly Shut-downs

GORMAN-RUPP PUMPS SAVE MONEY

Pumping troubles are greatly reduced and 40% of costs saved with the increased efficiency of the GORMAN-RUPP design. 3 H.P. does what formerly required 5 H.P.

Maintenance problems are minimized due to the extreme simplicity of design — the impeller is the only moving part. Any wearing parts are quickly and easily replaced with common tools. Pumps are furnished bronze fitted, and of all-bronze construction.

Costly shutdowns are practically eliminated. Gorman-Rupp pumps run indefinitely, with little or no attention. Automatically self-priming — ideal for remote location and control, these pumps require very low headroom, are efficient, reliable, and maintain nearly normal capacity under any working head.

All GORMAN-RUPP pumps are **guaranteed** in plain language.

Write for Bulletin No. O-ME-11

FOR STRIP MINE WATER HANDLING

GORMAN-RUPP centrifugal pumps will handle the toughest jobs, no matter how large a volume of water. They will **prime faster, higher and pump more dirty water** than any other pump of comparable size. Self-priming centrifugal pumps range in capacity from 1½-inch, 5,500 G.P.H., to the powerful 10-inch, pumping 240,000 G.P.H.

WRITE US ABOUT YOUR PUMPING PROBLEMS

DISTRIBUTORS

Auto Machine Company, Marion, Illinois
Athens Armature and Machine Co., Athens, Ohio
The Bittenbender Co., Scranton, Pa.
Buckeye Machine Supply Co., New Philadelphia, Ohio
Bluefield Supply Co., Bluefield, W. Va.
Cambridge Mach. & Supply Co., Cambridge, Ohio
Central Mine Supply Co., Mt. Vernon, Illinois
Central Mine Supply Co., Madisonville, Ky.
Greenville Supply Co., Greenville, Ky.
General Machinery Co., Birmingham, Alabama
Guyan Machinery Co., Logan, W. Va.
Hoe Supply Co., Christopher, Illinois
Industrial Supply Co., Terre Haute, Indiana
Jackson Implement Co., Jackson, Ohio
Johns Equipment Co., Ft. Wayne, Indiana
McComb Supply Co., Harlan, Ky.
Mine Service Co., Lothair, Ky.
Reliable Electric & Equip. Co., Zanesville, Ohio
Superior Sterling Co., Bluefield, W. Va.
Tennessee Mill & Mine Supply Co., Knoxville, Tenn.
West Virginia Pump & Supply Co., Huntington, W. Va.
Weinman Pump & Supply Co., Pittsburgh, Pa.

THE GORMAN-RUPP COMPANY
305 BOWMAN STREET, MANSFIELD, OHIO

COAL MEN ON THE JOB . . .

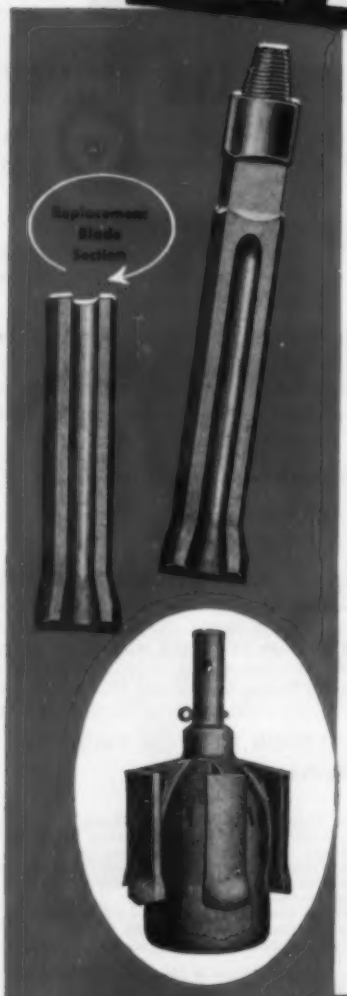
VALLEY CAMP COAL CO., Elm Grove, W. Va. (left photo): Allen Newcome (left), electrical engineer, and Alan McBane, general manager of the company's Southern Div.

SYCAMORE COAL CO., No. 12 Alma mine, Cinderella, W. Va. (right photo): A. L. Rowe (left, front row), preparation engineer; F. Turkette and W. H. Smith, section foreman; S. A. Randolph, foreman; W. M. Bartley (left, back row), night foreman; Elmo Fannin, section foreman; Orville Webb, chief electrician; and R. Turkette, construction foreman, who had worked for the company since 1910 and is the father of F. Turkette.

SPANG

BLAST HOLE BITS

Drill More Holes Per Bit, At Less Cost Per Hole



SPANG CHURN DRILL BITS, famous for long life and economy in the drilling of blast holes for the fragmentation of minerals or overburden, drill *more-holes-per-bit* at *less-cost-per-hole,* because they are fully heat-treated from end to end and have the *extra strength in pin and blade sections* to stand up under the toughest drilling conditions. They are made with semi-dressed ends for quicker, easier finish-dressing, in High Carbon, A.I.S.I. 4340, and Spang Molloy Steel.

Available also, as an added economy, are SPANG REPLACEMENT BLADE SECTIONS in the same grades of steel, and uniform forge section, for welding to pin and collar sections of original bits when long service has worn the integral blade to a point where replacement is desirable.

Anyway you look at it, SPANG BITS are your best buy for more holes at less cost per hole.

SPANG REAMER TYPE PILOT BITS FOR DRILLING LARGE DIAMETER HOLES

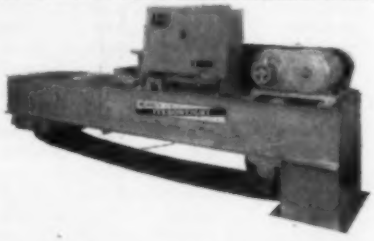
Can be supplied in all sizes and in any practical weight.

For information on SPANG BITS, and FREE CATALOG of Complete Line of SPANG Cable System Drilling and Fishing Tools, consult your nearest Dealer, or write direct to:

SPANG & COMPANY

DEPT. M-1 BUTLER, PENNSYLVANIA

For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.



Yes-feed by weight

with the MERRICK FEEDOWEIGHT, a self-contained automatic conveyor scale, with automatic gate for feed rate control. Powered feed regulator operates gate, without restraint on scale beam. Uniformly feeds bulk material BY WEIGHT; automatically totalizes weight of materials fed. Simple to operate. Slow moving parts mean long life. Easy to install, maintain.

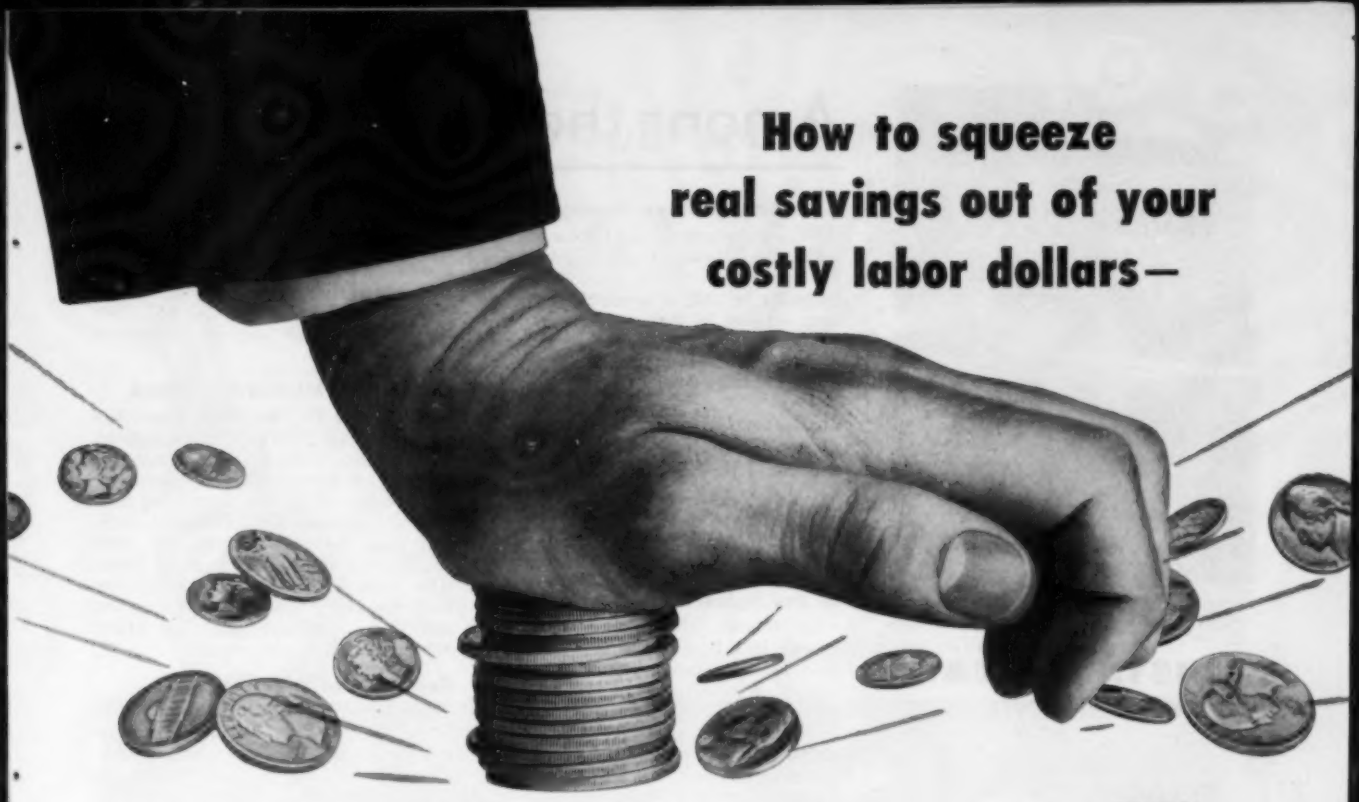
Manufacturers of

The Merrick WEIGHTOMETER, which weighs any material carried on a belt conveyor without interrupting conveyor operation. Complete descriptive matter on request.

MERRICK SCALE MFG. CO.

Engineers and Mfrs. of Automatic Weighing Equipment

PASSAIC, N. J.



How to squeeze real savings out of your costly labor dollars—

Simplify and Save

THE PURE OIL WAY!

6-WAY SAVINGS!

1. Simplifies Lubrication
2. Speeds-Up Application
3. Minimizes Mis-application
4. Cuts Down Inventories
5. Eases Stock Control
6. Streamlines Purchasing

Be *sure* with Pure— Sales offices located in more than 500 cities in Pure's marketing area.

Chances are, you can save real money on costly *man-hours* and *machine maintenance* by *simplifying* your lubrication schedule right down the line from purchasing to application.

Scientifically formulated to do many jobs equally well, Pure Oil's *money-saving lubricants* reduce inventories from many different oils and greases to a few *multi-purpose lubricants.*

Pure Oil multi-purpose lubricants not only cut down the number of lubricants but also eliminate the danger of mis-application and time-consuming identification of single purpose oils and greases.

Put this money-saving program to work in your plant! Write for our free booklet giving you full details.

It Starts Here!

PURE

PURE OIL INDUSTRIAL LUBRICANTS

FREE BOOKLET

The Pure Oil Company, Industrial Sales Dept. C-410
35 E. Wacker Drive, Chicago 1, Illinois
Please send me your free booklet on how to "Simplify and Save"

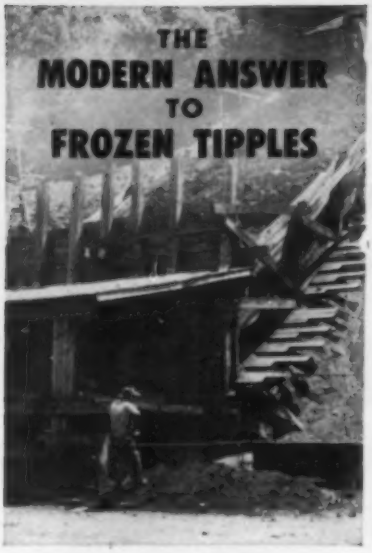
NAME_____

POSITION_____

COMPANY_____

ADDRESS_____

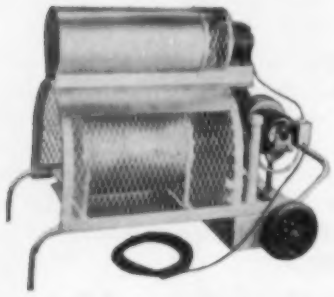
CITY_____ ZONE_____ STATE_____



INSTANT HEAT
WHEREVER — WHENEVER NEEDED

When cold snags coal as it did in the tipple of a West Virginian mine . . . or freezes machines and men . . . you need heat . . . and you need it fast.

Silent Glow Portable Heat is the answer. Fast . . . clean . . . safe . . . and completely portable, these rugged heaters provide all the heat you need . . . instantly . . . where you need it.



EIGHT MODELS—*A Portable Heater to meet every heating need . . . radiant or forced air . . . from 168,000 to 420,000 BTU per hour. Write for details today.*

SILENT GLOW
Portable
HEAT
ACCESSORY TO MODERN MINING

THE SILENT GLOW OIL BURNER CORP.
848 WINDSOR STREET, HARTFORD 1, CONNECTICUT

Among the Manufacturers

H&P Names Sales Manager

Heyl & Patterson, Inc., Pittsburgh, has appointed Edward H. D. Gibbs sales manager. Mr. Gibbs joined Heyl & Patterson in 1948 as a contracting engineer, serving in that capacity until his recent appointment. Prior to that, he worked in various engineering capacities for United States Steel Corp.

Clarkson Official Moves

Clarkson Mfg. Co., Nashville, Ill., has announced the resignation of Clyde E. Clarkson as vice president and director. Mr. Clarkson, co-founder of the company, will establish residence in Denver, Colo., and organize a sales company there.

Le Roi Sales Vice President

Le Roi Co., Milwaukee, Wis., has named Jack E. Heuser, former Engine Div. sales manager, vice president in charge of sales, with responsibility for the organization and management of a newly created Sales Div. to sell and service all Le Roi products. Mr. Heuser first joined Le Roi in 1939, leaving in 1941 to become a member of the Ampco Metal sales organization. In 1946 he rejoined Le Roi as assistant to the general sales manager. Le Roi also has announced the appointments of Ray H. Rodolf as general manager, Compressor Div., and Herschel V. Hiatt as general manager, Engine Div., in a move to better coordinate product development and research with sales and marketing. Mr. Rodolf had been sales manager, Construction and Mining Div., and Mr. Hiatt joined Le Roi last year as director of engineering.

O-B Names Mining Div. Head

Ohio Brass Co., Mansfield, Ohio, has appointed Paul E. Wright field engineer, Mining Div. Formerly district manager of the O-B eastern Kentucky territory, Mr. Wright will devote most of his time to field engineering on expansion shells and plugs for mine-roof support, with headquarters for the time being in Knoxville, Tenn. Previously Mr. Wright was with the High Point Coal Mining Co. and, more recently, with the Myers Whaley Co. as a sales engineer.

Kennametal Appoints NMS

Kennametal, Inc., has appointed National Mine Service Co. as a dealer to sell the Kennametal line of mining tools. Complete stocks of Kennametal tools are being maintained for prompt delivery at all six NMS warehouses, at Indiana and Forty-Fort, Pa.; Beckley and Logan, W. Va.; and Jenkins and Madisonville, Ky. In addition, Kennametal's own sales and service engineers will cooperate with

SERVICE RECORD STAMLER CAR-SPOTTERS...

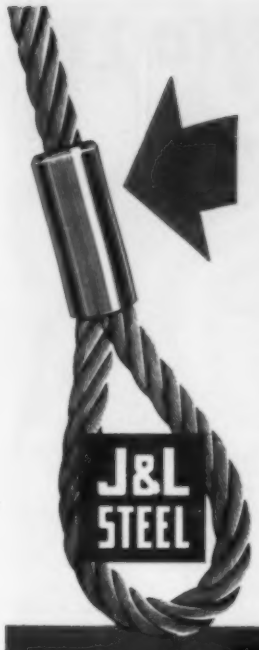
TOTAL SALES LAST 5 YEARS
$250,000.00

REPAIR PARTS SALES 1953
$2,184.58

WE ARE PROUD OF THIS RECORD

THE W. R. STAMLER CO.
PARIS, KENTUCKY

Schroeder Bros., Exclusive Eastern Sales Agent, Pittsburgh, Pa.
Union Industrial Corp., Carlsbad, N. Mex.

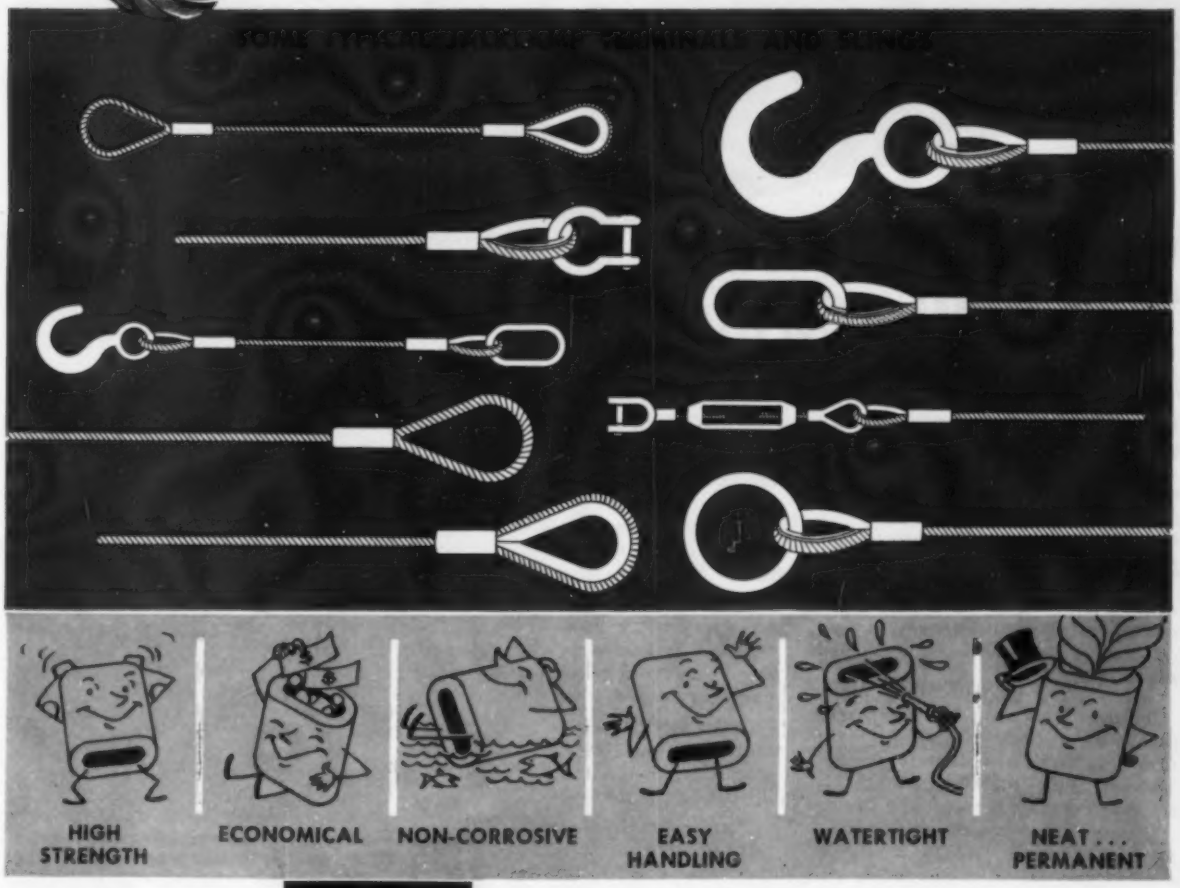


END YOUR SPLICING PROBLEMS WITH J&L JalKlamp SLINGS AND TERMINALS

Now, thanks to JalKlamps, you can order J&L Wire Rope with terminal splices which afford unsurpassed strength, corrosion resistance, safety and ease of handling. *And JalKlamp Terminals cost far less than you would spend to do the job yourself with conventional tucked splices.*

J&L JalKlamps are new non-corrosive special alloy sleeves with tremendous strength and unique cold forming characteristics. When squeezed around wire rope by a special hydraulic press, the JalKlamp metal "flows" into the spaces between the wires in the strands and the strands themselves, producing a neat, homogeneous splice.

Take advantage of the extra economy . . . long service life offered by J&L JalKlamps. You can get J&L Wire Rope Terminals and Slings spliced with JalKlamps in all standard constructions, and in diameters from ⅛" to 2" with these centers—SpringKore, PlastiKore, Fibre Core and IWRC.



J&L STEEL

Jones & Laughlin
STEEL CORPORATION — Pittsburgh

with Transite* Mine Service Pipe

MINE OWNERS AND OPERATORS know from experience that frequent pipe replacements due to corrosion can be a costly factor in mine operation. During the past 20 years they have been finding a solution to this problem in tough, durable Transite Mine Service Pipe. Made of asbestos, cement and silica by a special process, this pipe stubbornly resists corrosion . . . *from the inside and from the outside.*

Transite Pipe has other advantages important to mine operations. Light in weight, it is easy to handle . . . tight "factory made" couplings make installation easy. It is tough and strong . . . its flexible couplings enable lines to be laid around curves . . . often without the use of fittings, a big advantage in restricted mine passages.

SUCCESSFULLY HANDLES MANY MINE JOBS

For Mine Drainage, Transite Mine Service Pipe has an exceptional record of corrosion resistance that has enabled it to stand up for extended periods under conditions that have quickly destroyed ordinary pipe.

For water supply lines, Transite's unusually high carrying capacity and its immunity from tuberculation keep pumping costs at a minimum.

For other services, where a tough, durable and easily installed pipe is required, Transite Pipe is contributing important economies.

For further information write for Brochure TR-51A. Address Johns-Manville, Box 60, New York 16, N.Y.

JM PRODUCTS

*Transite is a Johns-Manville registered trade mark

Johns-Manville TRANSITE MINE SERVICE PIPE

Pangborn Head Marks 50th Yr

"FIFTY YEARS' Partnership With Industry" was the keynote of ceremonies marking the Golden Anniversary celebration of the Pangborn Corp., manufacturer of blast-cleaning and dust-control equipment, Sept. 1-2 at the home plant in Hagerstown, Md. Heading company officials participating in the event was Thomas W. Pangborn (left), the founder who, after 50 yr as president, still continues in active management. At the right is his brother, John C. Pangborn, first vice president. The 2-day program included speeches by various notables, including Gov. Theodore R. McKeldin, of Maryland.

NMS personnel in supplying assistance to mines in tool selection and demonstration, and training of mine personnel, the company points out.

Thermoid Names Div. Manager

Thermoid Co., Trenton, N. J., has appointed Robert Keach manager of the Industrial Rubber Div., succeeding Lloyd R. Leaver, who is continuing in a consulting capacity. Prior to joining Thermoid, Mr. Keach served as general plant manager, Industrial Rubber Products Div., Firestone Rubber, and, more recently as vice president and general manager of Quaker Rubber Corp.

I-H Transfers District Heads

International Harvester Co., Chicago, has transferred G. D. Partridge, International truck district manager at Cincinnati, to the Detroit district as manager. E. D. Maher, formerly assistant district manager, Cincinnati, succeeds Mr. Partridge as manager in that district. E. W. Dodson, formerly branch manager, Charlotte, N. C., has been promoted to assistant manager at Cincinnati. R. V. Ruth, formerly branch manager at Cincinnati, has been promoted to assistant manager of the New Orleans district.

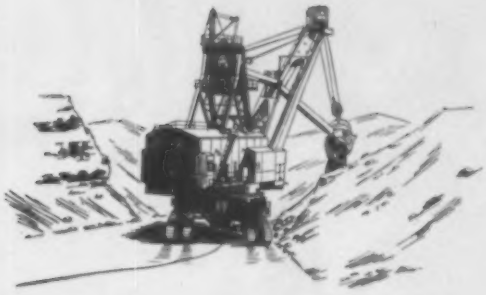
Raybestos Advances Sales Head

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J., has appointed Frank A. McBrearity Philadelphia branch manager of the Industrial Rubber Prod-

Roebling Roeclad Type SH-D Trailing Cable is approved by the Pennsylvania Bureau of Mines Approval P-111, and complies with the requirements of the U. S. Bureau of Mines for flame-resistance. It is continuously mold marked for positive identification.

For safety... maximum service life...

ROECLAD TYPE SH-D TRAILING CABLE



BUILT FOR heavy duty service on such equipment as shovels, draglines and dredges. This cable is designed to provide maximum protection for workmen and longest life on the job under the most arduous conditions.

CONSTRUCTION

Conductors are tinned copper wire, rope stranded for extra flexibility.

Insulation over conductors is ozone and heat resistant, high voltage rubber compound.

Cabling — Multiple conductor cables are cabled together with rubber fillers (for greater flexibility, jute fillers may be specified).

Reinforcing braid is seine twine, for greater impact and tear resistance.

Jacket is made of thick Roebling Roeprene (neoprene), lead mold cured to give the cable firmness and compactness. The jacket is highly resistant to impact, abrasion, moisture, sun-cutting and deterioration from oil and chemicals.

If you want more information call your nearest Roebling office (listed below) or your Roebling distributor, or write to John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING CF&I

Subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HGTS. BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, ROOM 239, HENRY W. OLIVER BLDG. • ROCHESTER, 1 FLINT ST. • ST. LOUIS, 3001 DELMAR BLVD. • SALT LAKE CITY, 525 W. 6TH SOUTH ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Hard Coal or Soft Coal...

Leading Operators use "Eucs"

Built for tough off-the-highway service, Rear-Dump and Bottom-Dump "Eucs" are cutting the cost of hauling overburden, coal and mine waste on scores of mining operations. Big payload capacity, fast travel speed and high job availability add up to more loads per hour and lower cost per ton or yard hauled.

Your Euclid Distributor will provide a hauling production and cost estimate for your operation . . . there's no cost or obligation so get in touch with him soon. Let him show you how "Eucs" can cut your coal hauling costs.

In the Pennsylvania anthracite field, Wadesville Production Company has used Rear-Dump "Eucs" of 22 to 34 ton capacity to move more than 17 million cu. yds. of overburden and nearly 2 million tons of coal since operations began in June of 1948. Performance has been so satisfactory that "Eucs" are standard hauling equipment on this big operation . . . 20 units are presently in use.

Truax-Traer Coal Company has used Bottom-Dump Euclid Coal Haulers at their Illinois operation since 1935. The Euclid fleet, 14 units of 20 ton capacity and six 25 ton "Eucs", delivers an average of 8500 tons of coal to the washing plant per eight hour day. High travel speed from pit to tipple on hauls up to 3½ miles and the long service life of the Euclids help to keep hauling costs at a minimum . . . every "Euc" purchased by the company is still in service!

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

ucts Div., succeeding G. R. Van Duser. Mr. McBrearity was central New York sales representative and has served for 19 yr in various sales capacities.

Fruehauf Vice President

Fruehauf Trailer Co. has elected Wallace N. Barker, former executive vice president, Pullman-Standard Car Mfg. Co., a vice president and assistant to the president. For the last 34 yr, Mr. Barker has been associated with Pullman-Standard and its affiliated companies.

Ruberoid Acquires Gypsum Co.

The Ruberoid Co., New York, in a step towards greater product diversification has acquired the assets and business o. Ebsary Gypsum Co., Rochester, N. Y. The move will introduce Ruberoid, a leading building materials manufacturer, into the gypsum field.

Olin Advances Monaghan

Frank J. Monaghan has been appointed to the newly created position of sales manager, Explosives Div., Olin Mathieson Chemical Corp., E. Alton, Ill. Mr. Monaghan has been with the Olin organization since 1939 and formerly was sales manager of the Liberty Powder Co., an Olin Mathieson subsidiary, with offices in Pittsburgh.

I-H and Diamond T Agreement

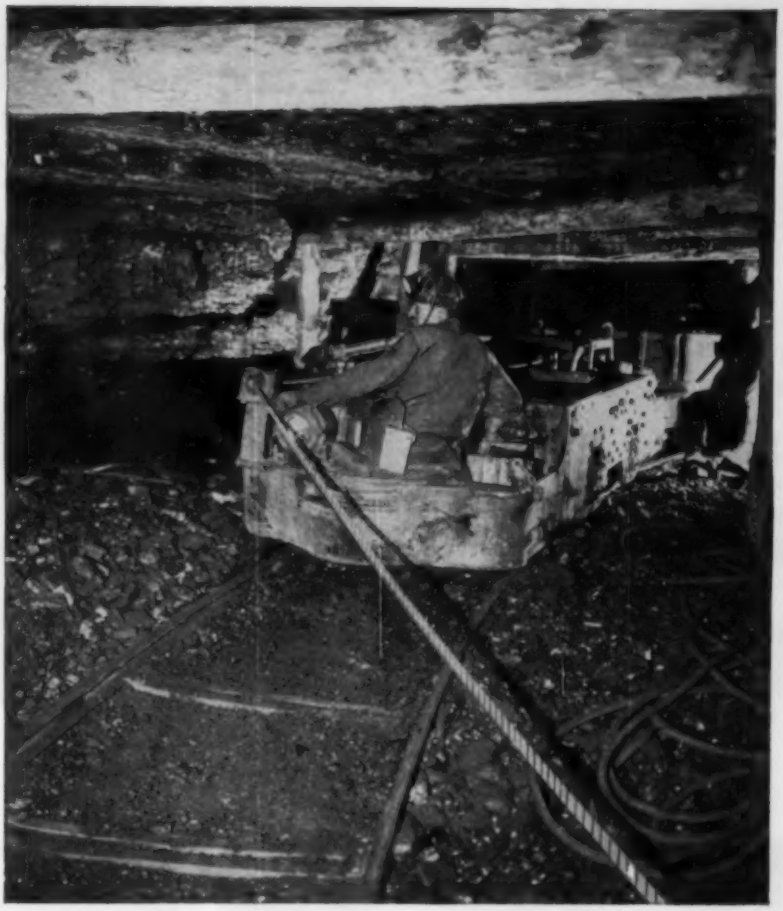
International Harvester Co. and Diamond T Motor Car Co. have announced jointly an agreement whereby Diamond T will assemble some special models of motor trucks for International Harvester at its Chicago plant, and Harvester will manufacture for Diamond T certain components, such as, gasoline engines, transmissions and axle assemblies used in its truck models. Reporting that for some years it has been seeking an efficiently located facility in the Midwest which could assemble the larger, more-specialized types of International trucks, Harvester pointed out that the Diamond T Co., a long-time producer of motor trucks in Chicago, has both space and experienced employees to undertake such an assembly job. The manufacturing agreement in no way affects the sales activities of the two companies.

And For Your Information . . .

Carboloy Dept., General Electric Co., Detroit, has named Michael D. Barnett sales representative for the midwestern district. Mr. Barnett joined G-E in 1951, and has worked in both engineering and marketing.

The Texas Co., New York, has named Dr. Wayne E. Kuhn general manager of the newly-created research and technical department. Dr. Kuhn has been manager of the company's technical and research division since 1938, which now has departmental status.

National Bearing Div. of American Brake Shoe Co., St. Louis, Mo., has appointed Norman Birch vice president in charge of operations, and I. Eugene Cox vice president in charge of engineering and development. Mr. Birch, general



CUT DOWN ON *cable* LOSS

If you have cable wear problems, Ruberoid Insulating Tape is the right solution. Ruberoid Insulating Tape strengthens your cable with a vise-like power, so that you can drag it anywhere with complete safety . . . even acid pools or jagged surfaces will be no hazard. Its virtual immunity to abrasion is one of the reasons that it has been the preferred tape for protecting mining machine cables in coal mines for over 60 years. You can be assured of a longer, more economical life for your cable with these seven cost-cutting features:

- Double grip...both sides adhesive
- Great tensile strength . . . tough
- Won't tear, ravel or pucker
- Resists abrasion
- Acid- and alkali-proof
- Extra thick . . . one layer insulates
- Exceeds A.S.T.M. specifications by [illegible]% in adhesiveness, [illegible] in tensile strength, [illegible]% in dielectric strength.

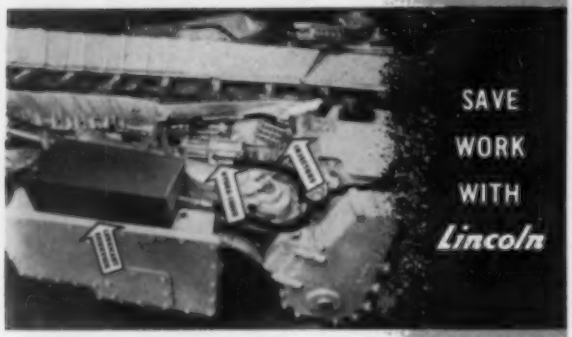
For further information, write The Ruberoid Co., 500 Fifth Avenue, New York 36, N. Y.

The RUBEROID Co.

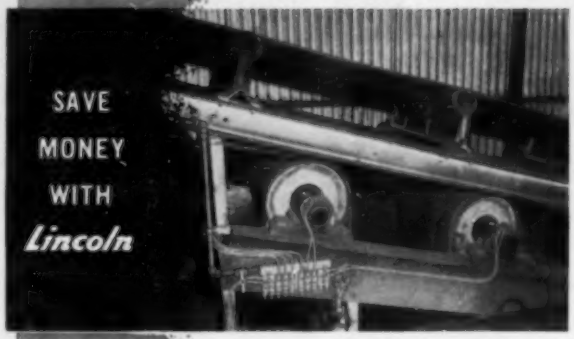
ASPHALT AND ASBESTOS BUILDING MATERIALS

here's why **Lincoln** lubricating equipment

slashes operating costs IN MINES



A Centralized Lubrication System frees manpower for other work . . . automatically lubricates 68 bearings simultaneously, on each loader, at Philip Sporn Mine.



Centralized Lubrication Systems save Hanna Coal Company $32,240 a year in labor alone at their Georgetown preparation plant.

A Lincoln Centralized Lubrication System automatically lubricates 500 bearings and increases the profitable working life of equipment at Wierton's Isabella Mine.

This unique Power Lubrication Unit is taken right to the job to speed up equipment maintenance at Perry Coal Company, O'Fallon, Illinois.

For more information about Lincoln Lubricating Equipment for the mining industries, write for Catalogs 64 and 80.

Lincoln

THE MOST TRUSTWORTHY NAME IN LUBRICATING EQUIPMENT

LINCOLN ENGINEERING COMPANY

5729 Natural Bridge Avenue, St. Louis 20, Missouri

COAL MEN ON THE JOB . . .

BELL & ZOLLER COAL CO.—Herman E. Knight, general superintendent, West Kentucky Div., Madisonville, Ky.

foundry superintendent of the division since 1952, joined the company in 1939. Mr. Cox joined Brake Shoe in 1935 as a research engineer and formerly was vice president in charge of engineering.

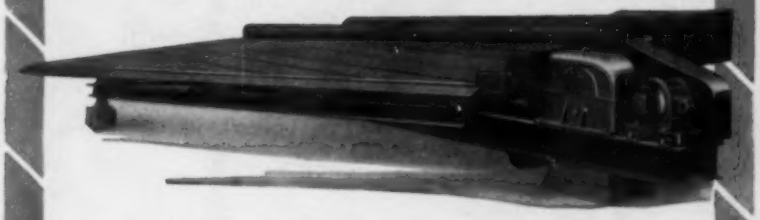
National Mine Service Co. has been appointed exclusive distributor in the mining industry for Sonotone Corp.'s sintered-plate nickel-cadium battery. Over a half-million of the radically different batteries have been produced by Sonotone for military purposes, and they now have been freed for commercial and industrial usage. Powering of shuttle cars, mine locomotives and mine jeeps are among the immediate applications for the battery, Gordon MacVean, NMS president, points out.

Its 500,000th mile of wire rope was manufactured Aug. 18 by the 97-yr-old Leschen Wire Rope Div. of H. K. Porter Co., Inc. Instead of figuring how many times the wire rope would cross the continent or go around the world, Leschen estimates that if its wire rope were to have encircled its home city of St. Louis, it would have gone around it more than 12,370 times to make a solid steel fence 515 ft high.

Clark Equipment Co., Benton Harbor, Mich., has named additional dealers to sell and service the Michigan line of its Construction Machinery Div. Dealers and territories include: Ed Meyer Tractor Co., Mt. Vernon, Ill., for southern Illinois; Dempster Bros., Inc., Knoxville, Tenn., for eastern Tennessee and northwest Georgia; and Standard Equipment & Supply Co., N. Little Rock, Ark., for most of Arkansas.

General Electric Co. has named two managers and a specialist to the parts and repairs sales section of the Locomotive & Car Equipment Dept., Erie, Pa., as follows: Donald G. Carr, manager of railroad regional parts center; James H. Williams, manager of parts sales; and K. O. Anderson, locomotive rebuild specialist and sales engineer. Mr. Carr

For Top Efficiency in Washing Fine Coal Sizes



It isn't only the quality of its washed coal product that has made the SuperDuty DIAGONAL-DECK Coal Washing Table so famous. Coupled with this exceptionally clean end product is optimum recovery from raw coal feed, at a very low washing cost per ton.

This efficiency has led to industry-wide acceptance. During the past decade, practically every important new installation has included from a few, up to as many as 64 SuperDuty Tables.

Hundreds of experiences are a matter of record. Whether your interest is in washing coal for the steam market or the preparation of metallurgical coal, it will pay you to investigate SuperDuty.

Send for Bulletin 119. No obligation, of course.

CONCENCO SPRAY NOZZLES

These handy nozzles are simple, flexible and economical. They are removed or replaced in a moment's time. One drilled hole in the spray line permits quick clamping, assembly for the best washing, sluicing or spraying you require. Removal and replacement is possible in a moment's time, with perfect alignment and leakless connections always assured.

THE DEISTER ★ CONCENTRATOR COMPANY
903 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

Dorr Thickener-earthen basin team Jamison Coal and Coke Company's Hostetter, Pa. washing Plant.

Something new has been added in the coal industry . . . a Dorr Thickener-earthen basin team to recover plant water at the Hostetter, Pa. washing plant of Jamison Coal and Coke Company. First of its kind in this field, the use of the earthen basin substantially reduced installation costs compared to the least expensive conventional type of tank construction.

Quick Facts on the Installation

Equipment: 50 ft. dia. Dorr Type S Thickener installed in a 75 ft. dia. earthen basin.

Operations: 550 GPM of refuse at 8 to 10% solids is pumped into the Thickener. Underflow averaging 35% solids is filtered and discarded. Filtrate is recirculated to Thickener feed. Refuse contains fine coal clay and pyrite with 1.8% retained on 100 mesh and 13.8% on 200 mesh. 73.8% of this material passes a 325 mesh screen.

During the initial operation fine material sealed any cracks and openings in the basin and eliminated all water seepage through bottom or side walls.

Why not talk to a Dorr Engineer on the application of this team in your plant? Just write The Dorr Company, Stamford, Conn.

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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.

Offices, Associated Companies or Representatives in principal cities of the world.

started to work with G-E in 1917 in Erie, and since 1952 has been manager of locomotive parts. Mr. Williams joined the company in 1936 and previously was assistant production manager of the department. Mr. Anderson joined G-E in 1947 on the engineering training program, and since 1951 has worked in the rolling stock sales section.

Ohio Brass Co., Mansfield, Ohio, recently invited winners of the first two Ohio Brass Foundation scholarship awards to visit its Mansfield factory. They are: David L. Powell, Mansfield winner, and Russell M. Stender, winner from Barberton. The Foundation, a nonprofit organization established by O-B, awards college scholarships to students from its plant areas who plan to seek degrees in certain technical sciences.

United States Steel Corp., Pittsburgh, Pa., has named David H. Boyd executive vice president of the Union Supply Co. and the Homewood Stores Co., subsidiaries of U. S. Steel. Mr. Boyd, who has been purchasing agent and general merchandising manager since 1948, joined the Union Supply Co. in 1936.

General Electric Co. has appointed Walter E. Sutter manager of sales for instruments and industrial electronic products, Commercial Equipment Dept., Syracuse, N. Y. Joining G-E in 1946 in the company's engineer test program, Mr. Sutter has been associated with the company's microwave application and sales section in various positions.

Stewart-Warner Corp. has inaugurated a new building program necessitated by continuing expansion of the Winkler line of heating and cooling equipment at its U. S. Machine Div. A one-story brick addition, containing nearly 50,000 sq ft, is being erected at the largest of its three plants in Lebanon, Ind., and should be finished by the first of the year.

Pacific Wood Products Co., Inc., an affiliate of the Bowers Battery & Spark Plug Co., is being transferred to a site near Reading, Pa. An Oregon corporation since 1938, the firm formerly was engaged in the manufacture of wooden separators for Bowers automotive storage batteries. The new plant, covering more than 7,000 sq ft, will serve as a research and development center for a new-type nickel-cadmium battery which Bowers is planning to manufacture for the American market.

Carver Pump Co., Muscatine, Iowa, has named James E. Kuppe general sales manager, succeeding Robert E. Tanner, who is also vice president and general manager of the company. During his many years at Carver, Mr. Kuppe has served as sales representative and assistant sales manager.

Farris Flexible Valve Corp., Palisades Park, N. J., an affiliate of Farris Engineering Corp., has named Robert N. Gierse sales manager. For over 5 yr, Mr. Gierse was industrial sales manager in the Instrument Div. of Thomas A. Edison, Inc., and for 20 yr previously, was with the United States Gage Div. of American Machine & Metals, Inc.

the "New Canton" specially designed for LOW COAL

the '30' track cleaner

Canton Quicksure Cable Splicer
Makes an on-the-job cable splice. Practically no down time. No special tools required. Just ground around meshed cable ends. Stronger than the cable.

. . . saves hundreds of dollars per mile cleaning costs . . . and get this . . . by cleaning up 100 tons of spillage and dirt you have saved buying and applying up to 200 tons of rock dust. Your future savings will finance a Canton Track Cleaner. Why wait?

Write, please use street and zone numbers.

THE AMERICAN MINE DOOR COMPANY
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Rock Dusters . . . Switch Throws . . .
Car Transfers . . . Automatic Doors.

SLIPKNOT . . . SYMBOL of SAFETY
in the Mining Industry

SLIPKNOT FRICTION TAPE LEADS ALL OTHERS IN PREFERENCE

Consistent high quality . . . far in excess of all specifications . . . has made Slipknot the most widely used friction tape in the mining field.

This outstanding Friction Tape is guaranteed not to dry out. It will not ravel at the edges and retains its exceptional adhesive qualities under all conditions.

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PLASTIC ELECTRICAL TAPE

Another Top Performer, Plymouth Plastic Electrical Tape is thinner — for neater, more compact jobs. Has high dielectric strength, resists water, oil and corrosion.

BACKED BY MORE THAN 50 YEARS OF MANUFACTURING INTEGRITY

PLYMOUTH RUBBER COMPANY, INC.
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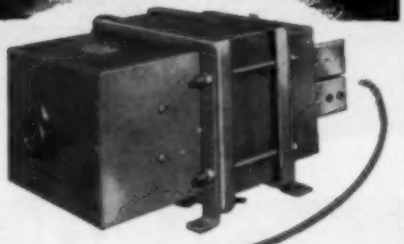
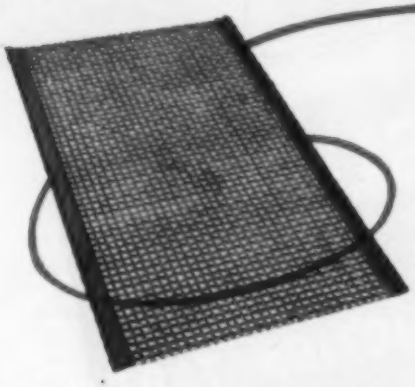
HANCO SCREEN HEATERS

ELIMINATE *Costly* SCREEN BLINDNESS

FASTER, MORE ACCURATE SIZING

HANCO electric heaters are engineered to meet top capacity requirements for heating **all** metallic screen cloth. Mechanical abuse such as "beating" or brushing can be **eliminated completely** when you install a HANCO electric heater. Treat your screens the modern way—get HANCO.





Available in five different assemblies. HANCO engineers have designed and constructed electrical screen heaters to fit YOUR make of screen. Note: Reduction in openings can be effected to meet ever changing specifications.

LOOK AT THESE FEATURES

Faster screening—faster processing means fewer "returns".

Elimination of mechanical abuse to keep screens open.

Longer screen life — no manual cleaning increases screen life up to 800%.

Fewer shut downs for replacement of worn screens.

HANCO quick change assemblies assure easy cloth changes.

Low maintenance cost. HANCO heaters are designed for heavy-duty service.

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PIONEERS IN ELECTRIC SCREEN HEATING — FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING

COAL MEN ON THE JOB . . .

CANNELTON COAL & COKE CO., Cannelton, W. Va.: R. L. Turner (left), general mine foreman, No. 100A mine; W. T. Hawkes, superintendent of mines; E. T. Faulkner, transitman; J. R. Moore, assistant to the superintendent; W. B. Pendleton, transitman; and E. Q. Maner, rodman.

NEWSWORTHY ACTIVITIES of your company are interesting to other Coal Age readers, so tell us about them. Write The Editor, Coal Age, 330 W. 42nd St., New York 36, N. Y.

ARMSTRONG-BRAY HYDRAGRIP

HYDRAULIC PULLERS

Valuable Maintenance Tool

With the handy portable HYDRAGRIP and a few ARMSTRONG-BRAY Pullers, one can quickly, safely and easily remove gears, wheels, bearings, sheaves or parts from shafts, can reinstall them with equal ease. Single centered ram assures aligned thrust that moves parts along shafts smoothly without wedging or binding. Saves time, saves parts—ends battering and breakage. The HYDRAGRIP—comes complete with handy, portable, hydraulic hand pump, high pressure connecting hose and 17½-ton capacity hydraulic jack with interchangeable heads.

Write for Catalog Sheet—describes HYDRAGRIP and complete line of standard and special external and internal pullers.

ARMSTRONG-BRAY & CO.

5340 NORTHWEST HIGHWAY • CHICAGO 30, ILL.

The FIRST loader designed specifically for Piggyback* Mining

The LONG MODEL 88 PIGLOADER

- **A low-height, heavy-duty, SINGLE-MOTOR machine capable of continuous, high capacity operation!**
- **Long wheel base with wide tracks gives unprecedented stability and positive operation even in soft bottom!**

•

PIGLOADER SPECIFICATIONS . . .

Rated Capacity: Average—3 Tons Per Minute, Maximum—5 Tons Per Minute; **Tramming Speed:** 120 Feet Per Minute; **Weight:** 14,000 Lbs.; **Electrical Enclosures:** U.S.B.M. Permissible Type; **Motor Horsepower:** A single 35 HP electric motor drives all machine operations; **Machine Control:** All functions are controlled hydraulically; **Electrical Control:** Non-reversing magnetic with start-stop pushbutton; **Conveyer Chain:** Heavy duty single strand design.

Another exclusive development by the originators of the Piggyback system of conveyor mining!

It's a proven fact that, for uninterrupted haulage from the working face, nothing even approaches the efficiency, operating economy and low capital investment of Piggyback Mining. Now—with the introduction of the Model 88 Pigloader—this unique system can be expected to offer even greater advantages.

A caterpillar-mounted machine, the Model 88 is very heavily built to withstand the hard usage of high-tonnage Piggyback mining. At the same time it is readily maneuverable and simple to operate. All functions, including raising and lowering the head and tail, are controlled hydraulically from a single bank of fingertip control valves. Further, the short length (16′), low overall height (26″) and narrow width (5′8″) of the Pigloader permits easier operation in close quarters and low coal.

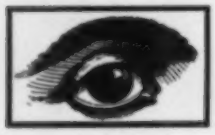
If you're looking for more tons per man, higher total tonnages and lower operating costs, it will pay you to switch to low-investment, low-maintenance Piggyback Mining.

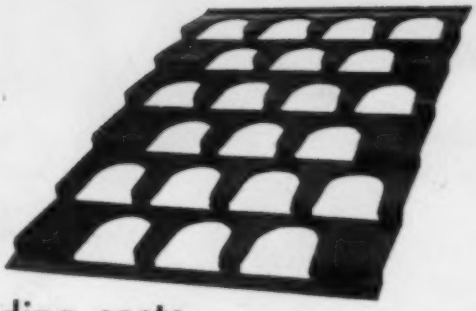
*Trade Mark

For complete details or a demonstration, write us today!

The LONG Company
OAK HILL, W. VA.
Formerly Long Super Mine Car Co.

How to see





through blinding costs . . .

use Hendrick flanged lip screen

Costs caused by blinding on vibrating and shaking screens are an unnecessary drain on profit. By practically eliminating costly delays due to blinding, Hendrick Flanged Lip Screen can greatly help your profit picture.

Secret of Hendrick Flanged Lip Screens' success is their tapered shape of openings and steps that provide far better separation. Equally as ideal for shaking and gravity screens and discharge chutes, Hendrick Flanged Lip Screens are furnished with openings varying in size from .010 x .025 x ½" to 10½ x 11½ x 13". The screen shown above measures 60 x 96" — perforations are equivalent in screening size to 14" diameter holes. It is being successfully used to size block coal. For more details write Hendrick direct.

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MANUFACTURING COMPANY

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

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Cut Faster Last Longer Cost No More

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After proving in our own world-wide contract drilling operations that Sprague & Henwood Oriented Diamond Bits (in which each individual diamond is set with its hardest edge or "vector" toward the work) cut much faster and last much longer than when diamonds are set at random, we made them available to other users and THOUSANDS are now cutting costs for diamond-drill operators throughout the United States and many other countries.

Specialized equipment and large-scale production enable us to furnish them in a wide variety of types and sizes, with either cast- or powdered-metal matrices, at no advance in price; making them the most economical diamond bits ever produced.

Bulletin 320 illustrates and describes all types and gives complete working data. Write for a free copy and tell us about your diamond drilling requirements. Our experienced executives welcome opportunities to make money-saving suggestions.

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Bituminous Operators Organize To Work With Federal Agency

Representatives of the bituminous coal industry working with the government's inter-departmental committee have organized the Bituminous Coal Industry Committee. The governmental committee, headed by Arthur S. Flemming, Mobilization Director, was named by President Eisenhower July 16 to study the bituminous coal industry's needs and recommend a policy in the interest of national security. Previous to a meeting with inter-departmental committee, the operators elected R. E. Snoberger, president of the Truax-Traer Coal Co., chairman of the new group, following his nomination by Roger Cooper, president of the Kentucky River Coal Co., who had served as informal chairman. James W. Haley, vice president, Jewell Ridge Coal Corp., was named secretary of the new committee.

At the same time, the coal committee set up several subcommittees to work with representatives of the departmental committee. The subcommittees and their chairmen are: government buying, Dr. Charles J. Potter, Rochester & Pittsburgh Coal Co.; transportation, A. R. Matthews, Pocahontas Fuel Co., Inc.; residual oil, Mr. Cooper; export, John Routh, Routh Coal Co.; natural gas, R. E. Salvati, Island Creek Coal Co.; and research, Harry LaViers, South-East Coal Co. The individual subcommittees, using facilities of the National Coal Association and other coal and government groups, are to prepare reports and recommendations for submittal to the inter-departmental committee. The government buying subcommittee was reported to be the first to discuss its report with the government group, followed by the report on natural gas submitted Sept. 16 and that on residual oil imports Sept. 17.

The 6-man inter-departmental committee, composed of representatives of the Interior, State, Commerce, Labor and Defense Departments, is scheduled to present its recommendations for relief of the industry, by November or earlier, to the Cabinet Committee on Energy Supplies and Resources also set up by President Eisenhower in July.

Preparation Facilities

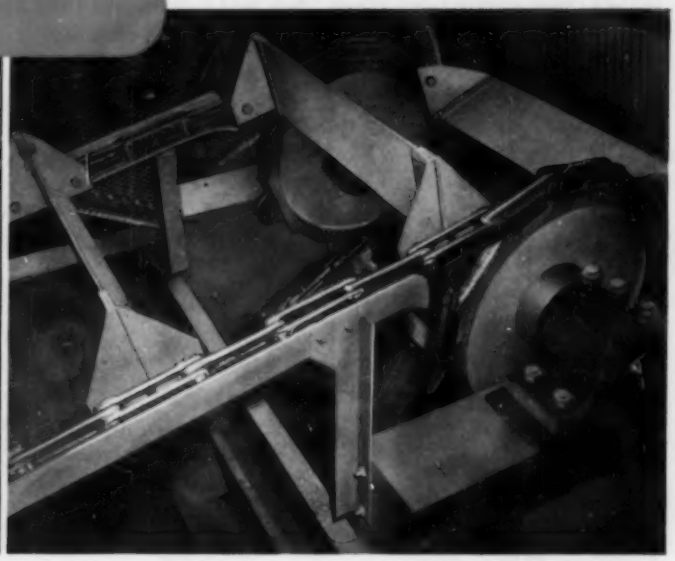
Bradford Coal Co., Bigler, Pa.—Contract closed with The Daniels Co., Contractors, Inc., for new preparation facilities to handle up to 150 tph of R-O-M; including new-design screening apparatus, storage and loading equipment, water-clarification system, and a DMS Dense Media coal washer.

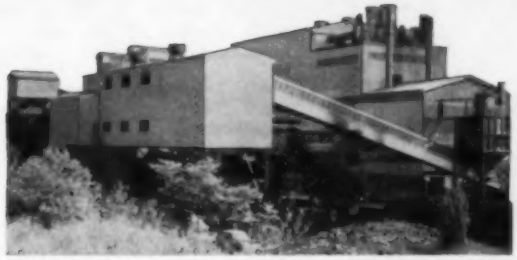
Pocahontas Fuel Co., Inc., Bishop, Va.—Shipment by Deister Concentrator Co. of one No. 7 SuperDuty Diagonal-Deck coal-washing table.

Davis & Adkins Sand Co., Farrelsburg, W. Va.—Shipment by Deister Concentrator Co. of one No. 7 SuperDuty Diagonal-Deck coal-washing table.

"We Saved Thousands of Dollars for Jamison with..."

Wilmot Shop-Assembled Conveyor Units





Designers of Ultra-Modern Plant Confirm Economy of Wilmot's Complete Conveyor Building Service

The new No. 9 plant, above, of Jamison Coal & Coke Co. is representative of the advanced engineering in coal preparation. Located at Farmington, W. Va., it was designed and built by Industrial Engineers & Constructors, Inc.

OVER MILE OF WILMOT CHAIN IN JAMISON PLANT

In addition to over 6000 feet of Wilmot rivetless chain for the plant's 16 conveyors, the builders specified Wilmot shop-assembled take-up, idler and drive-shaft units. They state that savings in the time required for workers to assemble these on the job amounted to thousands of dollars. Let your Wilmot representative explain why leading firms increasingly depend on Wilmot's complete choice of conveyor parts.

Send for **248-PAGE BOOK** *on Chain and Conveyors*

WILMOT ENGINEERING CO. HAZLETON, PA. *Plant:* WHITE HAVEN, PA.

A single answer to 4 mining problems

All four of these mining problems were economically solved with Armco Liner Plates. On a pound for pound basis these plates cut costs while improving safety and efficiency.

Costs are lower because of easy installation. Corrugated metal design of Armco Liner Plates provides safe strength with less weight and material. This means that one man can carry, hold and bolt an Armco Liner Section into place. Tightening bolts with a structural wrench is done inside the structure. Work goes on smoothly, quickly with unskilled labor.

Other advantages you will like include fire-resistance and freedom from excessive maintenance.

With the wide range of diameters and gages available, you can find the right size of Armco Liner Plates to meet your particular mining needs. Write for details. Armco Drainage & Metal Products, Inc., 2133 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco Liner Plates

ARMCO

Mine Entries

Bins

Overcasts

Shafts

New Books for Coal Men

Coal-Carrier History

From Mine to Market: The History of Coal Transportation on the Norfolk & Western Ry., by J. T. Lambie. Here's the story of the growth of a railroad, its role in the development of rich coal fields and a forecast of future developments in the Nation's energy pattern that may affect the railroad's operations. *380 pp. 6½x9½-in; cloth. $6, New York University Press (Business History Series), Washington Square, New York 3, N. Y.*

Heavy-Duty Lubricants

Lubricating Oils for Industrial Engines. This new booklet lists the trade names of over 1,200 lubricating oils offered by 366 oil companies and tells what properties are claimed for each oil by the supplier. The oils are divided into three major types, according to the requirements they are said to meet. *48 pp. 5½x8½-in; paper. 20c per copy (plus postage for shipment of more than one copy), Internal Combustion Engine Institute, 201 N. Wells St., Chicago 6, Ill.*

Roof-Safety Film

Bar It Down. This new color film shows the right and wrong way of taking down loose rock from roof and ribs. Each film copy is accompanied by a discussion leader's guide. *35-mm film strip or 2x2-in slides. For prices, address National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

Other Books and Booklets

The Lower Kittanning No. 5 Coal Bed in Ohio, by R. A. Brant. R. I. 21, Ohio Geological Survey. 59 pp. 8½x11-in; paper. Division of Geological Survey, Columbus, Ohio.

The following publications by the U. S. Bureau of Mines are available only from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Prices are as noted below. All are 8x10¼-in; paper.

Carbonizing Properties of American Coals: Index of Coals Tested by the Bureau of Mines, by R. L. Brown, J. D. Davis, D. A. Reynolds and F. W. Smith. Bulletin 536. 17 pp. 20c.

Barrier Pillars in Wyoming Basin, Northern Field, Anthracite Region of Pennsylvania, by S. H. Ash. Bulletin 538. 251 pp plus maps. $1.75.

Injury Experience in Coal Mining, 1950: Analysis of Mine Safety Factors, Related Employment and Production Data, by S. T. Reese, V. E. Wrenn and E. J. Reid. Bulletin 540. 64 pp. 40c.

NEWS of your company, personnel changes and other activities, are interesting to other Coal Age readers, so why not make it a point to tell us about them. Write The Editor, Coal Age, 330 W. 42nd St., New York 36, N. Y.

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Special Cranes
Ore Bridges
Gas Producer Plants
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Gas Reversing Valves
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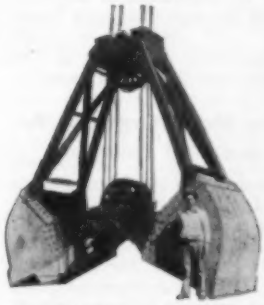
Mine Hoists
Skip Hoists
Clamshell Buckets
Power Cylinders
Locomotive Cranes

Wellman ore and coal handling bridges

give fast and efficient operation

One of two 6-ton Coal Handling Bridges in this installation.



6-ton Wellman Williams Type Coal Bucket used with these bridges.

● Take advantage of Wellman's long experience in designing and building handling bridges of many types and capacities. Your selection from the complete line will provide fast and efficient handling of coal or ore. Wellman equipment, in service the world over, is recognized for its long life and dependable service. It is backed by more than half a century of engineering experience.

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FLOOD CITY FUSED LINE SWITCH ELIMINATES *Costly* SAFETY SWITCH PROBLEMS

RUBBER SEALED CASE...

The cast iron, RUBBER-SEALED case eliminates the hazards of coal dust and water seepage...yet is readily accessible. Unit is compact, only 12"x7"x4¾". Extra creepage insulation is provided by using ¾" mounting panel and large clearances to ground.

THE FUSES ARE SWITCH BLADES

The fuses are the switch blades and are the only parts that should need replacing. Other features include; Spring brass fuse support that gives a snap-type break when opened... Copper supports hold blades in perfect alignment...Reinforced clips held permanently in line by grooved supports...Clamp type terminal in the center. One or two fuses may be used, capacities: 70-200 amps.

Also used as protective disconnecting switch for any motor in its range, or for feeder protection at night when trolley line switch is open.

FLOOD CITY
BRASS & ELECTRIC CO.
JOHNSTOWN, PA.

Sales Agent:
Kanawha Rail & Machinery Co.
Charleston, W. Va.

DRILLING IS A SNAP... with SCHROEDER BH DRILL BITS

For Hydraulic hand-held coal drills

Designed especially for hydraulic hand-held coal drills, the Schroeder BH Drill Bit assures faster drilling with less effort.

Check these features...

- Tough carbide tips designed to hold edge longer.
- Heat treated forged steel bit body.
- Greater clearances provided to reduce drag.
- Reduced area of penetration for ease of feed.
- Available in 1¾" and 1⅝" sizes to fit standard ½" square auger bits.

Standard Augers also available from stock.

Send today for details and price.

1116 Penn Ave. Pittsburgh 1, Pa.

SCHROEDER BROTHERS
HYDRAULIC, ELECTRIC & PNEUMATIC MINING EQUIPMENT

EXpress 1-1571

NEWS BRIEFS . . . From p 137

Operations Administration, discussed the program, which will help relieve unemployment in U. S. coal fields while also assisting underdeveloped foreign countries. Expected to cost some $150 million, the coal purchases will start immediately, Mr. Stassen said, and will include 2,000,000 tons each from Kentucky, Pennsylvania and West Virginia; 1,500,000 tons from Illinois; and 2,500,000 tons from other regions. The coal will be shipped to various coal-importing countries in exchange for products that could be transferred to the needy countries or in return for local currencies that could be used to purchase needed products or services in the importing countries.

P&R Plans Research on Anthracite Gasification

The Philadelphia & Reading Coal & Iron Co., Philadelphia, has entered into arrangements with Hydrocarbon Research, Inc., for a long-range experimental program in coal gasification utilizing anthracite, it was announced early last month by Edward G. Fox, P&R president. The project, which will be carried on at Hydrocarbon Research's Trenton laboratories, was described by Mr. Fox as the latest step in the company's research program into the conversion of anthracite into synthesis gas. P&R has been carrying on evaluation studies and applied research work in this field for the past several years. The new project will be conducted as an integrated part of the coal company's broad experimental and research program, under the executive direction of Dr. Robert J. Day, P&R director of research.

NCA Offers Marketing Aids for Retailers and Coal Salesmen

New radio and newspaper advertising books for fall and winter use by coal retailer groups and by individual retailers have been published by the Market Promotion Dept. of the National Coal Association. Copies have been supplied to retail organizations having contracts with NCA and are available to others free of charge. Ready-to-print mats of the newspaper ads also are available at nominal charges to retailers and associations who do not have contracts with NCA. The newspaper ad book contains 78 different advertisements promoting the sale of coal and modern equipment, while the radio book offers a large assortment of spot announcements of 1 min or less. Another of the new sales tools prepared by NCA's Market Promotion Dept. is a booklet captioned "Practical Degree-Day Information and How to Use It." The 16-p pocket-size booklet shows how degree-day information can be used by coal salesmen to measure fuel requirements of a building, ascertain plant operating efficiency and calculate relative fuel costs. It is available at production cost, 15c per copy. The degree-day booklet is a companion piece of the "Comparative Fuel Cost Analysis" form and the more recent "Preliminary Project Report" also provided by NCA.

Harwick Wins Pennsylvania Bituminous First Aid Contest

The first aid team representing Harwick mine, Duquesne Light Co., Harwick, Pa., led by Capt. Michael Kandziolka, won top honors among 31 competing teams at the 12th Annual Pennsylvania State Bituminous First Aid Contest at Ebensburg, Sept. 11. The winning team, with a score of 99.350, was awarded a cash prize of $350 and the Mine Safety Appliances Co. trophy. Other members of the championship team are Joseph Wilkosz, Louis Bott, Joseph Pitlock, Edward Wilkosz, Presley Graham and Joseph Sarso.

Other ranking teams and their scores were: second, Montour 10 mine, Pittsburgh Coal Co., Andrew Hostovich, captain, 99.301; third, Crucible mine (Team No. 1), Crucible Steel Co. of America, Donald W. Huntley, captain, 99.300; fourth, Robena mine (Team No. 2), U. S. Steel Co., John Chambers, captain, 99.250; fifth, Hutchinson mine, Westmoreland Coal Co., Nick Maruschak, captain, 99.000.

The meet was sponsored by the Pennsylvania Department of Mines, in cooperation with coal operators, the UMWA and the Bureau of Mines. Dennis J. Keenan, general superintendent, Sterling Coal Co., was general chairman. Principal speakers were R. T. Laing, executive director, Central Pennsylvania Coal Producers' Association; Mr. Keenan; Charles Ferguson, director of safety, UMWA; J. J. Forbes, director, USBM, and W. J. Clements, Secretary, Pennsylvania Department of Mines.

New Safety Awards Offered by Holmes Safety Association

New safety awards, gold or silver lapel pins for mineral industries workers, were authorized at the 1954 annual meeting of the Joseph A. Holmes Safety Association. Awards will be granted to those in any branch of mineral industries who have achieved outstanding safety records, but only upon receipt of a request and a supporting individual safety record properly filled out by the candidate's employer. Workers completing 30 yr without a lost-time accident are eligible for a gold pin showing the association insignia and the number of accident-free years. A silver pin of similar design will be awarded those completing 20 yr of accident-free service. Cost to employers is estimated at $1.10 for the silver pin and $1.35 for the gold, with a luminous decalcomania replica for the recipient's safety hat at no extra cost.

The practice of awarding Certificates of Honor for 40-yr service without a lost-time accident will be continued. The new awards were adopted as a means of giving earlier recognition to safe workers and creating additional incentive for those entering the mineral industries.

The award will be presented by the employer, who is responsible for the accuracy of the submitted record, and the recipient must be working for the company that submitted his record at the time of presentation. Forms to be used in applying for the new awards may be

install roof bolts easier, faster...

New West Virginia expansion sleeve roof bolts are designed for quicker tightening, increased holding power. Deeper, angular teeth have larger biting area. Shell finger extension over bolt end provides initial anchorage without the use of ears or pal nuts on bolt; permits plug to be pulled down, expanding flexible fingers. These advantages make bolting a safer, faster part of mining cycle.

Wedge-type or expansion sleeve roof bolts available in all lengths. Threads waterproof-wrapped and spray-protected from rust. Write for latest roof bolting literature.

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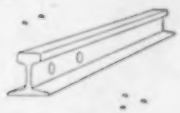

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The modern plant of Owatonna Aggregates Corp., Medford, Minn., produces washed sand & gravel. The Nagle type "SWO" pump at this plant is handling the heavy media mixtures for their sink-float operation. It is one piece of equipment this producer does not have to worry about.

The Nagle "SWO" welcomes tough, gritty jobs. Water end parts are of wear resistant manganese steel or one of a choice of other wear or corrosion resistant alloys. There are NO submerged bearings—NO stuffing box. Readily handles thick mixtures. Performance records over a 10-year period indicate extremely low replacement parts costs. Yes, Nagles cost FAR LESS in the long run!

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PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

secured from Harry Gandy, Jr., safety director, National Coal Association, Southern Building, Washington 5, D. C.

N&W to End Mining of Coal

The Norfolk & Western Ry. is planning to discontinue the production of coal for its own use and in the future will buy the coal it needs from commercial producers along its lines, it was reported early last month. The railway announced that it would curtail operations at its Pond Creek Colliery properties Oct. 1 and will close down the plant entirely as soon as its leases expire. In making the announcement, the company said: "For several years the railway has been increasingly concerned about the economic difficulties in obtaining fuel from the Pond Creek operation. Efforts to solve these problems have been unsuccessful."

Company Sues UMWA for Inability to Supply TVA

A $1,500,000 damage suit charging breach of contract was filed against the UMWA Sept. 19 in federal court in Knoxville, Tenn., by E. J. Davis, Lexington, Ky., president of the Central Coal Co. In the complaint, the company charged that because of a strike brought on over seniority questions it has been unable to fulfill its $40 million contract to supply the TVA with coal for the Kingston steam plant. The company, which has operations in Putnam and Cumberland counties, near Monterey, Tenn., contracted to supply coal to the TVA plant for 10 yr, with an option for another 10 yr. Failure to settle the dispute has made it impossible for the company to operate, and the firm contends in its suit that the strike is a breach of the contract it made with the union in 1951.

USBM Reports Coal Production

Bituminous coal production from Jan. 1 to Sept. 11, 1954, totaled 255,342,000 tons, a decrease of 18.9% from the same period of 1953, according to the USBM figures released last month. Output for the week ending Sept. 11, 1954, was estimated at 6,645,000 tons, compared with 8,100,000 for the same week in 1953. In anthracite, 1954 production was running 15.5% behind 1953, the Bureau's report showed. Through Sept. 11, the 1954 output totaled 18,033,000 tons. Production for the week ending Sept. 11 was 425,000 tons, as against 495,000 in the same week of 1953.

W. Va. Closes 32 Mines as Risks; Also Hits Strippers

The W. Va. Department of Mines closed 32 coal mines during July for inadequate compliance with safety regulations, it was reported Sept. 3. The shutdowns were a result of the department's campaign begun in June to tighten enforcement of safety rules, according to Frank B. King, mines chief. Of the 32 mines, 13 were closed for 1 to 10 days, but at the end of the month 19 had not yet been permitted to re-open. Major reasons for the shutdowns cited by Mr. King were: insufficient ventilation; dan-

COAL MEN ON THE JOB . . .

STEPHENS—ELKHORN FUEL CO., Manton, Floyd County, Ky. (left photo): C. H. Martin (left), supply clerk; Dexter Caudill, chief electrician; Cecil Sherman, superintendent; and A. H. Mandt, vice president and general manager.

SOUTH-EAST COAL CO., Big Chief mine, Seco, Ky. (right photo): B. F. Gish (left), mine superintendent, and Logan Music, shipping and preparation manager for the company.

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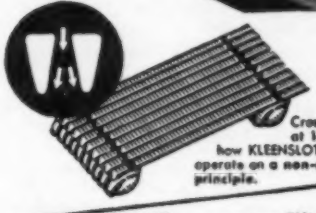
Perfect separation on wet or dry screening. Rigid construction and method of installation prevents "whipping".



Cross section at left shows how KLEENSLOT Screens operate on a non-clogging principle.

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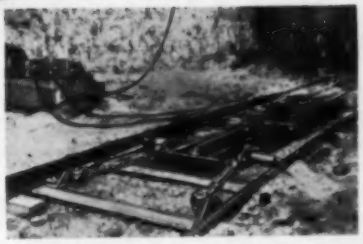
NOW IN SERVICE!

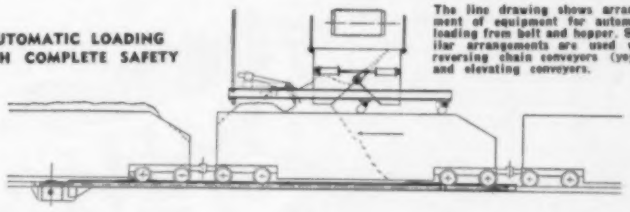
TWO MODELS:

1. Direct Mechanical Drive
2. Hydraulic Cylinder Type Hose Coupled in Remote Power Unit (Shown in illustration at right)



These two Nolan models will help you meet every requirement and condition in spotting cars for loading . . . *and can save you many shift hours per day!* The Porta-Feeder mounts between the rails on top of the track ties, and is secured by rail clamps. No excavation or preliminary foundation work is necessary. There are no ropes or cables. Reciprocating pushing dogs deliver constant forward feeding motion.

AUTOMATIC LOADING WITH COMPLETE SAFETY



The line drawing shows arrangement of equipment for automatic loading from belt and hopper. Similar arrangements are used with reversing chain conveyors (yoyos) and elevating conveyors.

The Nolan Porta-Feeder has been in successful use in many mines for over five years. This modern method of moving cars has been accepted as the most efficient in the industry. Its ease of installation and quick movability recommends its use in any mine.

We will be glad to show you a mine in your vicinity where the Nolan Porta-Feeder is operating. Write us now.

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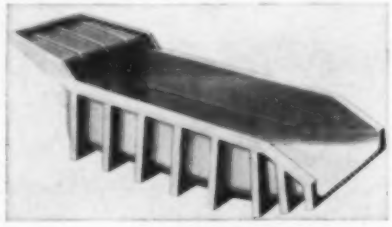
Heil Rock Bodies are built for heavy-duty service for any off-the-road or on-the-road job. There's extra strength in every rugged inch of the rigidly reinforced body to take the punishment of heavy loads without sagging. There's smooth power and lasting stamina in Heil Heavy-Duty Hoists.

Heil Bodies and Hoists are engineered to your requirements for body length and load distribution. Ask your nearby Heil distributor to show you every feature, or write for more information.

HEIL ROCK-RUGGED BODIES are fabricated of ¼" (or heavier) steel plate, rigidly reinforced by box member ribs. 2" hardwood cushion sandwiched between body bottom and wearing plate absorbs load shock. Heated floor construction available for winter operation.

HEIL HEAVY-DUTY HOISTS are available in the double-acting type (power up and power down) and the standard power up and gravity return.



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gerous roof conditions; failure to secure approval before opening mines; inadequate timbering; working under dangerous strip-mine highwalls; and substandard clearances underground. Earlier, on Aug. 30, Mr. King reported that some 20 strip-mining operations had been closed down for violating West Virginia strip-mine regulations since the mines department had inaugurated a "get tough" policy last January. Most of the suspended operators have since complied with the regulations and are back at work, Mr. King said.

Anthracite Institute Research To End; Companies Take Over

Discontinuation of the research activities of the Anthracite Institute was confirmed Sept. 15 by J. B. Jillson, secretary-treasurer of the institute. A major factor in the move was reported to be the establishment by several major producing companies, including Glen Alden and P&R, of research laboratories of their own. Glen Alden opened a chemical analytic laboratory last year and P&R is currently expanding its research program. Hudson Coal has carried on its own research study for some years. The Anthracite Institute's activities will revert to a normal trade association program, collection of statistics, representation on legislative matters, etc., and Dr. R. C. Johnson, former director of research, is reported to have resigned to join a New York firm. Anthracite research will be continued, Mr. Jillson pointed out, at both the USBM laboratory at Schuylkill Haven and at Penn State College, the latter program under support supplied jointly by the industry and the state.

Traux-Traer Opening New Mine

The West Virginia Div. of the Truax-Traer Coal Co., Kayford, W. Va., is currently developing a new property to replace reduced coal supplies from other mines and maintain an even flow of coal to customers. To be called the Thistle mine, the operation will mine the No. 2 Gas seam, 60 in thick. Now under construction between the two portals is a dump, coal from which will be crushed and either loaded into railroad cars over a tipple being built or carried by conveyor to the company's Shamrock cleaning plant.

Federal Aid for Fighting Mine Fires Approved

A bill sponsored by Rep. Ivor D. Fenton (R., Pa.) to authorize up to $500,000 annually in federal aid for fighting fires in inactive coal deposits was signed into law by President Eisenhower Sept. 1. The act, which requires that federal funds be matched by state or other agencies, provides permanent authorization for work the USBM has carried on for some time, but on a year-to-year basis.

Court Decision Upholds Pennsylvania Pollution Act

Stating that it was settled public a public use, the Dauphin County Compolicy to protect clean waters devoted to

mon Pleas Court has upheld the powers of the Pennsylvania Sanitary Water Board under the Clean Streams Act of 1945 by denying permission to a Jefferson County coal stripper to strip in the vicinity of a clean stream used as a part of the Punxsutawney water supply. The operator offered evidence to show that the water shed contained abandoned deep and strip mines opened prior to 1945, that the stream was alkaline and had not been turned acid by previous strippings and that the coal seam was low in sulphur. He contended in the argument that since practical means of removing acid mine drainage had not been developed, a permit from the board was not necessary and that the state had the duty to divert the acid drainage into polluted waters at its own expense. In rejecting the argument, the court also stated that the state should not be forced to assume the heavy financial burden of diverting acid mine drainage from a 50-acre coal tract to another, polluted water shed.

Two Utilities Add Power Units

The Niagara-Mohawk Power Corp. Sept. 1 put into operation the fourth 100,000-kw turbo-generator unit at its new Albany, N. Y., power plant. Now completed except for the finishing touches, the new 400,000-kw station took 4 yr to build and cost an estimated $50,000,000. It is expected to consume 3,500 tons of coal daily. The Cleveland Electric Illuminating Co. has placed a third 140,000-kw turbo-generator in service at its Eastlake power plant, it also was reported last month. Construction now is under way on a 208,000-kw unit scheduled for completion in 1955.

Annual Ohio Safety Meet Attracts Crowd of 10,000

The Gensie mine of the Warner Collieries Co. took top honors in the first aid contest at the 10th Annual Ohio Miners Safety and Accident Prevention Meet held in St. Clairsville, Ohio, Aug. 28. A crowd of some 10,000 people attended the event, which continued from noon until nearly midnight and featured, in addition to the contests, an unusual entertainment program, including a baseball game and crowning of a King and Queen of Safety. Runners-up in the safety contest were: second, Midvale mine, Columbia-Southern Chemical Co.; third, Nelms mine, Youghiogheny & Ohio Coal Co.; and fourth, Powhatan Mining Co. The meet was sponsored by the Div. of Safety and Hygiene of the Ohio Industrial Commission, in co-operation with the Safety Directors of the Coal Operators of Ohio, the Ohio Coal Association and District 6, UMWA.

Steel Companies Push Coke-Oven Construction

Another new battery of coke ovens will be constructed at the Lorain (Ohio) works, National Tube Div., U. S. Steel Co., it was announced Sept. 16. It will be the fifth new battery installed at Lorain since the plant was modernized

The Rugged RH

Page

AUTOMATIC DRAGLINE BUCKETS

Digs blasted rock, shale and hardpan. Its extra heavy cast high manganese steel lip and teeth resist the extreme wear and shock of digging compacted, abrasive materials. Write Dept. E for more information.

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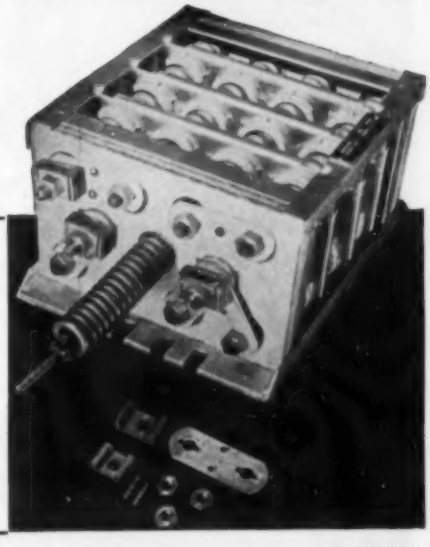

Have ample resistance to start locomotives smoothly on the first point and sufficient capacity for long life. No special frame construction is necessary. Just mount the units in place and connect controller leads.

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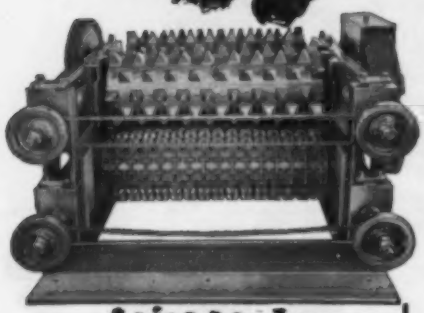
No matter what your coal crushing problem, there's a Gundlach crusher to do the job. Check this complete line of single and 2 stage crushers before you buy.

All Gundlach crushers are equipped with Gundlach Patented Crushing Rollers (Pat. No. 2578540) and are designed so that material size can be changed while the machine is running.



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in 1947 and will consist of 59 Koppers-Becker gun flue type ovens. When placed in operation, the new Battery H will carbonize nearly 1,100 tons of coal a day. Battery I, another group of 59 gun flue type ovens, under construction since May, 1953, is approximately 95% completed, it was reported. At the Campbell works of the Youngstown Sheet & Tube Co., Youngstown, Ohio, a new 76-oven, by-products coke battery began operation in mid-August. It has a daily capacity of 1,250 tons of coke, or about 450,000 tons a year. The push of the first heat culminated one of the largest construction projects in the Youngstown area for some years, the company reported.

Pittston-Clinchfield Merger Streamlines Coal Sales

J. P. Routh, chairman and president of The Pittston Co., announced Sept. 16 that the activities of various Pittston coal sales subsidiaries would be combined, effective Oct. 1, under the name, "Pittston Clinchfield Coal Sales Corp." The change will involve the elimination as separate selling companies of Pattison & Bowns, Inc.; Raleigh-Globe Coal Co.; and Davis Coal & Coke, Inc. J. T. Berta, president of Pattison & Bowns, Inc., will be president of the firm and sales personnel of the various subsidiaries will be integrated in the new setup. The newly combined organization will market exclusively the metallurgical, utility, domestic and steam coals produced by Clinchfield Coal Corp., Dante, Va., from its mines in Virginia and West Virginia, and the low volatile coals produced by Lillybrook Coal Co. and Amigo Smokeless Coal Co. It also will continue as exclusive distributor for Pittston Jet Black Anthracite coal produced by Pennsylvania Coal Co.

Local Ratifies Back-to-Work Pact With Panther Valley Coal Co.

Nesquehoning (Pa.) Local 1704, UMWA, Sept. 7, unanimously ratified an agreement with the Panther Valley Coal Co., virtually clearing the way for resumption of operations at three mines and a cleaning plant which were permanently closed June 27 by Lehigh Navigation Coal Co. The new company has been formed by a syndicate including W. J. Parton, president of LNC at the time of the closing; J. J. Crane, former general manager, LNC, and Frank and James Fauzio, stripping contractors, Nesquehoning. The closing of the mines and breakers in June idled 4,500 men in the Panther Valley, after a company-sponsored plan for lowering production costs was rejected by the miners even though it had been approved by John L. Lewis and other union officials. It is reported the re-opened mines and plant will provide employment for about 1,300 men and that mining may be resumed before the end of this month.

P&R Sells Bank Material

The Philadelphia & Reading Coal & Iron Co. Sept. 21 announced that it had

COAL MEN ON THE JOB . . .

BELL & ZOLLER COAL CO.—John W. Medlock, tipple foreman, Moss Hill mine, Madisonville, Ky.

completed a contract with the Lincoln Anthracite Co., Schuylkill Haven, Pa., covering the sale of some 2 million tons of raw material at its Lincoln slush bank near Tremont, Pa. The agreement provides for an initial payment of $800,000, plus a per-ton royalty as the material is processed in Lincoln Anthracite's preparation plant, and P&R will act as selling agent for the recovered material. The initial payment of $800,000 has been added to P&R's cash in its working capital, the company reports.

14 Named in Beating of W. Va. Mine Operator

Hearings for 14 men accused of beating an operator of a small mine near Richwood, W. Va., were scheduled for Sept. 21 after a week's postponement because three of the men were still being sought by state police. The other 11 men arrested on assault charges were released on bail, pending the hearings. The incident, which sent B. J. Short, owner of the Short Coal Co., to the hospital in a critical condition Sept. 8, reportedly stemmed from the wildcat strike being carried on against the Maust Coal & Coke Co. and affiliates. Mr. Short, who leases his mine from the Maust organization, was pulled from his truck and attacked on a road leading both to his property and one of the mines being picketed. District officials of the UMWA first said they had no information about picketing of the four mines and called it a wildcat strike, but later reported that picketing was begun because non-union men were infiltrating stripping operations and taking the jobs of union men. A company official said that he did not know why the strike was called and had not been presented with any grievances. Later, on Sept. 17, businessmen of Richwood joined together to send telegrams to officials of both the company and the union urging an early settlement of the 2-wk-old strike in the interests of the community.

Neff & Fry surge bin in mine picture

It must be that our silos as surge bins fit into the coal mine picture. Otherwise, we wouldn't build so many of them for the purpose.

The photo shows one at the Crichton No. 4 mine of Johnstown Coal & Coke Co. In it many tons can accumulate when the flow of coal is interrupted.

Our silos are excellently adapted for coal mine installation. The materials can be readily transported to difficult places. Erection is a relatively simple matter. The silos have the stamina to stand up and take it. We collaborate with the makers of conveying equipment. And our silos can be dismantled and rebuilt into larger ones or in different locations.

The only way we know if you are interested is to hear from you. We invite you to communicate with us.

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Builders Conveyoflo—the modern conveyor meter — totalizes the weight of dry material passing over conveyor belts. Continuous, automatic, extremely accurate — Conveyoflo is installed right in your present conveyor, or can be furnished as a separate, self-powered conveyor and scale unit. Capacity is limited only by the capacity of the conveyor belt itself.

EXCLUSIVE FEATURES

- Accurate . . . within ± ½ of 1% of actual weight from maximum to 50% of meter's rated capacity; within 1% from 50% to 25% rate; within 2% from 25% to 10% of rated capacity.
- Automatic totalizer compensation for variations in belt speed and changes in belt weight.
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Write for Bulletin 550-H4. Builders-Providence, Inc. (Division of B-I-F Industries, Inc.), 391 Harris Avenue, Providence 1, Rhode Island.

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Pa. Governor Names Coal Men To State Fuel Conference

Appointment of 27 representatives of the coal industry, the public and the state government to serve as members of a newly established Governor's Commonwealth Fuel Conference was announced Sept. 17 by Gov. John S. Fine, of Pennsylvania. Similar groups will be set up in 15 other coal-producing areas throughout the country, it was reported. Among those named to the Pennsylvania group were: Charles B. Baton, Baton Coal Co.; James R. Jamison, Jamison Coal & Coke Co.; Walter F. Schulten, Pittsburgh Consolidation Coal Co.; Ralph H. Moore, C. A. Hughes & Co.; J. William Wetter, Rock Hill Coal Co.; Dr. C. J. Potter, Rochester & Pittsburgh Coal Co.; Edward G. Fox, Philadelphia & Reading Coal & Iron Co.; Donald Markel, Jeddo-Highland Coal Co.; Francis Case, Glen Alden Coal Co.

Frank J. Earnest Jr., Anthracite Institute; Robert T. Laing, Central Pennsylvania Coal Producers' Association; Henry Sutter, Western Pennsylvania Coal Operators' Association; Dr. Elburt F. Osborn, Penn State College; Dr. Robert T. Gallagher, Lehigh University; Dr. Robert G. Cosen, Lafayette College; J. B. Morrow, consulting engineer, Pittsburgh.

William J. Clements, Pennsylvania Secretary of Mines; William W. Behrens, Deputy Secretary of Commerce; Thomas Kennedy, Mart F. Brennan, John Ghizzoni, William Hynes and Lester Thomas, UMWA.

Coal Company Earnings

Clinchfield Coal Corp. and subsidiaries—6 mo to June 30, 1954, net income of $411,149, or 53c a share, on sales of $13,431,814; against income of $928,861, or $1.19 a share, on sales of $17,963,130 for the same period of 1953.

Pittston Co. and subsidiaries—6 mo to June 30, 1954, net profit of $829,402, or $1.07 a common share, on sales of $77,512,979; compared with net profit of $950,636, or $1.50 a share, on sales of $81,478,374 in the same period of 1953.

Truax-Traer Coal Co.—3 mo to July 31, 1954, net income of $201,687, or 10c per common share, on sales of $9,001,598; compared to net income of $417,773, or 30c a share, on sales of $11,593,856 for the same 3 mo in 1953. Net income for 1953 period included nonrecurring profit of $189,070.

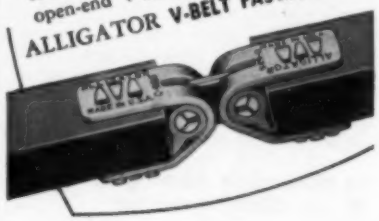
And For Your Information . . .

The contract between the UMWA and the Wise Coal & Coke Co., Dorchester, Va., has been cancelled, effective Sept. 30, it was reported late in August. The company employs some 175 men.

Re-opening of the No. 14 colliery, Gelso Coal Co., Port Blanchard, Pa., on a 6-wk trial basis was scheduled to Sept. 17, following an agreement by members of the UMWA local to produce cleaner coal, more carloads and better topping. The colliery, which has been idle for 6 wk, employs about 250 men.

WHICH V-BELT
is best
for you?

If the correct size of endless V-Belt is not readily available, or if you have to tear down machinery to install, then the best belt to use is open-end V-Belting fastened with
ALLIGATOR V-BELT FASTENERS



★ In this way you can make up V-Belts in *any length* to fit *any drive* the fast economical way — V-Belts that perform exceptionally well.

★ In contrast to link-type belts these ALLIGATOR fastened V-Belts have just *one* strong joint . . . *stretch and follow-up maintenance are reduced to a minimum.*

ALLIGATOR INTRODUCTORY V-BELT DRIVE UNITS contain V-Belting, Fasteners and Tools — everything you need in one compact package to make up V-Belts quickly. Available in sizes A, B, C & D.

Ask for Bulletins V-215 and V-216
Order From Your Distributor

FLEXIBLE STEEL LACING COMPANY
4638 Lexington Street, Chicago 44, Illinois

ALLIGATOR
V-BELT FASTENERS

Parmanco

H-81-53

HORIZONTAL DRILL

Easily cuts drilling time
IN HALF

Completely Re-designed

- *with hydraulic feed*
- *horse power increased to 81 with "254" cubic inch engine*

Included in the new design is a sturdier frame, with the elimination of racks, pinions, and all mechanical power feed gearing. The four individually adjustable jacks make possible faster set-up and smoother drilling.

The H-81-53 drill is designed for drilling 5-6-8 inch holes to 100 feet or more. The greatly increased 81 h.p. engine in combination with the hydraulic feed makes possible the reduction of footage time by at least one half. All drive gears are totally enclosed. Power feed features direct hydraulic feed eliminating reduction gearing in hydraulic feed system.

This new drill—the very latest in design—is equipped with self-starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes, and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling. Send for complete details.

PARIS MANUFACTURING CO.

PARIS, ILL.

How Sterling Rock Salt Helps

HUDSON COAL COMPANY

Scranton, Pa.

SELL MORE COAL!

Major Anthracite Producer Proves Dollar Value of Salting Winter Shipments with STERLING ROCK SALT

Because their customers wanted their winter coal to arrive unfrozen and easy to unload quickly—Hudson Coal Company began experimenting with anti-freeze treatments in 1945.

After two years of tests, Hudson has used STERLING ROCK SALT exclusively for the past 7 years—for these five reasons:

- **Costs less.**
- **Handles easier.**
- **Can be stored without loss.**
- **Non-toxic. Harmless to workers' garments.**
- **Dissolves slower. Effective longer.**

SAVES MONEY AT THE MINE, TOO

Hudson also saves dollars and valuable time at the mine, using STERLING ROCK SALT to prevent frozen scales, track switches—to keep roads and tracks open. And for removing ice and snow from platforms and all work areas for efficiency and safety.

Order Sterling Rock Salt NOW . . .
in carloads, bulk or handy 100-lb. bags.

STERLING AUGER-ACTION ROCK SALT

International Salt Company, Inc., Scranton, Pa.

MAIL THIS COUPON TODAY

International Salt Co., Inc., Dept. CA-10, Scranton, Pa.

☐ Please have your representative call.
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BITUMINOUS

Security with Service

BENEFITS THE MINING INDUSTRY

OPERATOR

WORKER

The Bituminous slogan, "Security with Service," applies to all phases of mining operation . . . to operators and workers alike. It keynotes the Bituminous Safety Engineering program, consisting of regular mine inspections . . . analysis of mine hazards . . . survey recommendations . . . accident prevention activities . . . reduction of operating expenses resulting from accidents . . . and establishment of production efficiency. Bituminous Safety Engineers are constantly alert to the hazards that might affect Bituminous Workmen's Compensation policyholders . . . and to forestall these hazards before they take shape. Thanks to their training and skill, Bituminous' slogan is a "living" phrase, packed with meaning for the mining industry.

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND, ILLINOIS

OVER 30 YEARS OF SERVICE TO THE MINING INDUSTRY

A temporary restraining order barring UMWA pickets from interfering with three coal operations was issued by Judge J. Frank Graff, of Armstrong County, Pennsylvania, late in August. The order, which is permanent in 20 days if not appealed, prohibits UMWA Districts 2 and 5 from picketing the three small mines the union has been seeking to organize.

A fire of undetermined origin Sept. 11 caused heavy damage to the tipple and equipment of the Sycamore Coal Co., at Cinderella, W. Va., according to reports. At Yancey, Ky., a fire Sept. 4 destroyed the tipple of the Harlan Fuel Co., with damage estimated by company officials at $250,000. Cause of the blaze was not immediately determined. Burning of a tipple at the mine in January, 1953, halted operations for 25 days.

The Yankee Atomic Electric Co. was chartered Sept. 22 as a Massachusetts corporation. The company was set up by a group of New England electric companies to plan construction of an atomic power plant in the New England area.

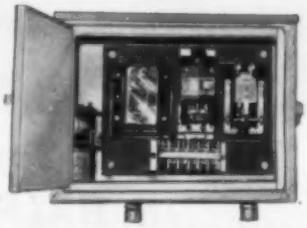
Bituminous Coal Research, Inc., is again this year offering its Combustion Series to engineering groups and others interested in the handling, burning and sale of coal. Qualified engineers made available by BCR member companies provide one or more talks on modern methods of handling and burning coal and answer questions on the use of coal.

The West Virginia State Supreme Court has been asked to study the state's refusal to permit strip mining of coal in the Kumbrabow state forest. D. S. Blount, of Roanoke, Va., operating as the Cavalier-Peerless Coal Co., has asked for a review of a Taylor County court order barring him from stripping a section of the park.

All 10 mines of The New River Co. were expected to be back to work Sept. 13, following a 2-wk stoppage that began at the company's Garden Ground mine, Mt. Hope, W. Va. The announcement was made by George J. Titler, president of UMWA District 29, who said that the grievance would be discussed with the company after the 1,800 miners affected returned to work. The stoppage reportedly originated as a protest against the discharge of one man.

A 3-man team of consultants to study the request of Robert L. Stearns Jr., Stearns Coal & Lumber Co., Stearns, Ky., that he be permitted to strip-mine coal in the Cumberland National Forest has been proposed by J. Earl Coke, Assistant Secretary of Agriculture. Mr. Stearns seeks to strip 500 to 1,000 acres of a 47,000-acre tract which he sold to the U. S. Forest Service in 1937 but on which he retained all mineral rights. Following his turndown twice by the U. S. Forest Service, Mr. Stearns appealed to Secretary of Agriculture Benson early last month.

equip your belt conveyors for SAFETY...start or stop at ANY point on the line with...



ENSIGNEER CONTROLS

Belt conveyor systems equipped with patented Ensigneer Safety Controls may be alternately stopped and started by pressing together two bare wires mounted along the belt line. Time delay relay eliminates jogging . . . permits locking out for conveyor repairs.

Simple, foolproof . . . two dry cells provide 1½ or 3 volts for your entire system. Unit can be supplied with either A.C. or D.C. motor control. Enclosure is dust-tight and drip-proof. Request Bulletin No. 1125 for further information.

ENSIGN

ELECTRIC AND MANUFACTURING CO.

914 Adams Ave. Huntington 4, W. Va.

New··· BELKNAP

COAL WASHING SYSTEM

"A Packaged Plant"

FUEL PROCESS COMPANY

An ideal unit for small and medium-sized companies looking for these primary essentials – basic structure – prescreening and sizing – duplex washing – closed system solution recovery – sludge recovery – storage and salvage tanks. You get them all in a BELKNAP "Packaged Plant" engineered and designed to fit your specific operation.

Investigate These Advantages

1. Costs Less to Buy—Fewer auxiliary units are required, therefore, the System costs less.
2. Uses Less Medium—Medium consumption averaged as low as 1¢ per ton of coal washed for a full year operating period.
3. Uses Less Water—Water consumption averaged 1½ gallons per ton of coal washed over a full year period.
4. Exceptionally Low Maintenance Cost—Cost records for a five-year period show average of less than ½¢ per ton maintenance costs. Power cost is exceptionally low.
5. No Stream Pollution—The New Belknap Coal Washing System meets all existing specifications regarding anti-stream pollution.
6. No Sludge Disposal Problem—Sludge is collected in the System and disposed of as cleaned fines.
7. Low Operating Cost—The Automatic Specific Gravity & Level Control makes necessary a minimum of supervision to maintain maximum cleaning efficiency.

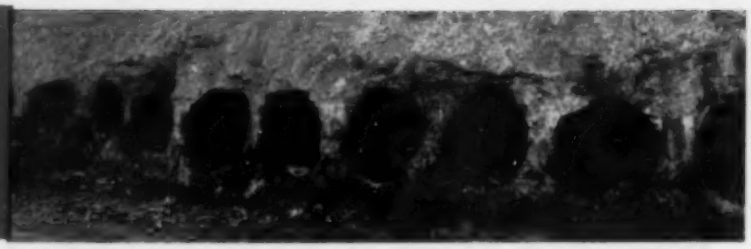
The New Belknap Coal Washing System has been developed and proved during the last three years in new plants in West Virginia, Virginia, Pennsylvania and Indiana . . . The BELKNAP SYSTEM is available in capacities from 40 tons to 250 tons per hour and size ranges as wide as 7" x 3/8" (1/4" on special applications).

Write for full descriptive bulletin

FUEL PROCESS COMPANY

"D" at 10th AVE.··· SOUTH CHARLESTON··· WEST VIRGINIA

SALVAGING LOST COAL



● McCarthy Coal Recovery Drills put new profit in worked-out strip mines by recovering clean lump or slack coal without disturbing overburden.

The drills bore horizontally into the heart of the exposed seam to pull out continuous streams of coal from depths of 100 feet and more.

Cost of this operation varies between $1.50 and $2.00 per ton, including amortization of investment. A three-man crew can handle the entire job, including loading.

Rate of recovery depends entirely upon operator skill, bench width, seam thickness and diameter of auger used.

We suggest you write today to determine which of four standard models is most suitable for your requirements.

McCarthy hydraulically controlled Drills are available with 4 to 24-ft. interlocking-auger sections in 20, 24, 30, 36, 42 and 48-inch diameters. Jacks are power operated with power supplied through gasoline, diesel or electric units.

Make it a point to investigate this economical new method for recovering coal right now.

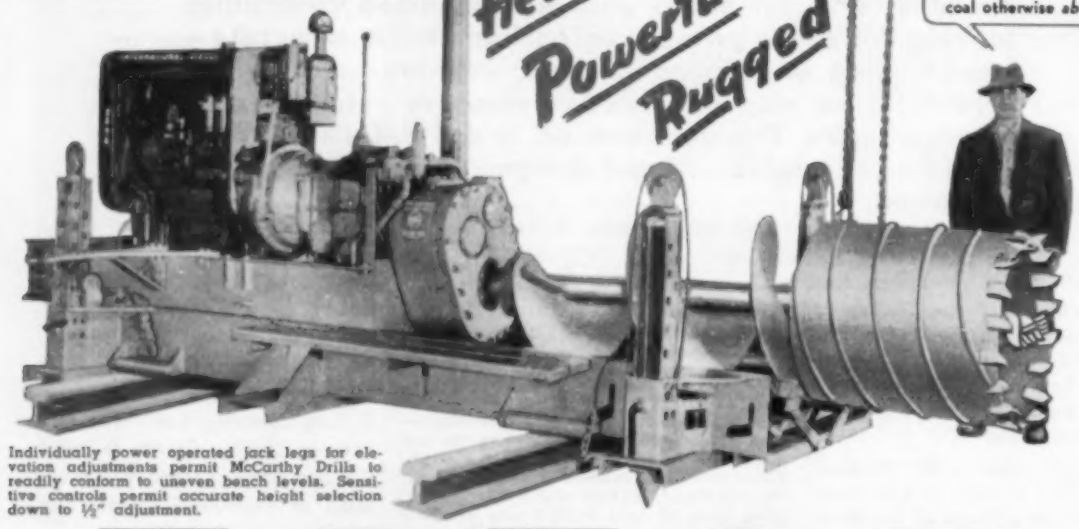
Near Salineville, Ohio, three men, using a single McCarthy Drill equipped with 24-inch augers, get out 90 tons of coal daily. The same number of men, working for the Bruns Coal Company, near Germano, Ohio, use 36-inch auger sections to produce 167 tons per day.

McCarthy Auger Hoist makes easy the handling of individual auger sections to allow fast operation in or out with minimum physical labor.

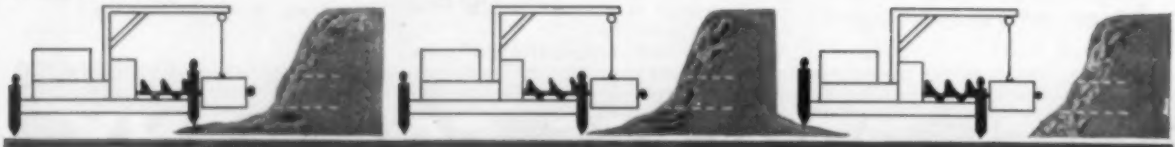
McCARTHY
New 36" Recovery Drill; weight 9,700 lbs.

Heavy Powerful Rugged

"I salvaged 200,000 tons of coal otherwise *abandoned.*"



Individually power operated jack legs for elevation adjustments permit McCarthy Drills to readily conform to uneven bench levels. Sensitive controls permit accurate height selection down to ½" adjustment.



THE SALEM TOOL CO.
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KVA	MAKE	Pri. V.	Sec. V.	Qs.
200	Pgh.	22000	220/440	3
125	West.	11000	2300	3
110	West.	2300/4000	207/103	3
100	G.E.	2300/4000	230/460	3
100	Davis	2300/4000	230/460	3
75	G.E. (Pyranol)	2400/4160	120/240	3
65	G.E.	2300/4000	206/103	3
50	Allis	2300	115/230	3
50	G.E.	2300	230/460	3
37½	G.E.	11000	230/460	3

MOTOR GENERATOR SETS

400 KW West. 550 v. 720R-Syn.-SK 2300/4000 v.
300 KW West., 275 v. 1200 R-Syn. 2300 v.
300 KW G.E. 275 v. 1200 MPC-ATI 2300/4000 v. Full automatic.
200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
150 KW G.E. 275 v. 1200 R MFC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
75 KW G.E. 275 v. 1200R. MPC-Sq. Cg. 440 v.

ROTARY CONVERTERS

2—500 KW G.E. 275 v. HCC6-1200R. 13,200 v.
300 KW G.E. 275 v. HCC6-1200R. 2300/4000 v.
300 KW G.E. 275 v. HC12-600 R. 2200/400 v.
300 KW West. 275 v. 1200 R. 2300/4000 v.

Will rewind transformers to your specifications
AC & DC REBUILT MOTORS—Any size

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P.O. Box 7991C — Pittsburgh 16, Pa.

DIESEL ENGINES • GENERATOR SETS
All Sizes—10 KW to 2000 KW—AC and DC
ALL UNITS FULLY GUARANTEED
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"The Machinery Man Known Everywhere"
MINE MACHINERY — INDUSTRIAL
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2 TELEPHONES $22.75

inter-communication handsets, two wire system. Included Two 3 volt batteries, 50 ft. of wire and simple wiring instructions. Additional wire 1 cent per ft. or $25.00 per mile. Complete list of telephone parts, handsets, magneto—common battery — and dial telephones, switchboards, etc. Write:
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Wanted—
Second hand coal & charcoal briquetting press in good operating order, capacity 1 to 3 tons per hour, price.
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REPLIES (Box No.): Address to office nearest you
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WANTED SALES manager for small manufacturing company with three salesmen in Central Pennsylvania coal field. Good proposition for man who can get results. SW-3953, Coal Age.

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COAL MINING engineer. Age 26. Four years experience in a 6,000 T.P.D. mine. Plant layout and design. Trouble shooter of difficult mining problems. Wmts location in South-East Asia. PW-3823, Coal Age.

New "SEARCHLIGHT" Advertisements
received by October 20th will appear in the November issue subject to limitations of space available.
Classified Advertising Division
COAL AGE
330 West 42nd St. NEW YORK 36, N.Y.

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18—5-SC Late type Joy Shuttle Cars, 250 V DC, equipped with airplane disc brakes, Magnetax controls, and elevating discharge. Purchased new in 1952. Practically new tires. All in A-1 condition. Price only $6500.00 each.

8—42E-9 Joy Shuttle Cars, 250 V DC, 36" high, practically new tires. Can be seen under power. Price only $2500.00 each.

3—200 KW General Electric late type Motor Generator Sets, 250/275 V DC, 1200 RPM, 3 phase, 60 cycle, 2300/4000 V AC, complete with switchboards and full automatic AC and DC switchgear. Only $6500.00 each.

4—150 KW General Electric Motor Generator Sets, 250/275 V DC, 3 phase, 60 cycle, 2300 V AC, 1200 RPM, complete with switchboards and switchgear. Only $2500.00 each.

Several late, low type 13-ton, 15-ton, and 20-ton General Electric, Goodman, and Jeffrey Locomotives, including one 20-ton General Electric Tandem Locomotive consisting of two (2) 10-ton units, purchased new in 1950, complete with air brakes, air sanders, contactor controls, and Timken roller bearing journals; also one practically new 15-ton Goodman with two 120 HP each #81 motors, 250 V DC, ballbearing, with hydraulic brakes, contactor controls and Timken roller bearing journals. All of these are offered at exceptionally low prices.

Several Link-Belt and McNally-Pittsburg 5-cell Coal Washers; 4-track and 5-track complete Steel Tipples; several Bradford Breakers; some very late type Jeffrey 29-UC Cat Mounted, permissible type Cutting Machines, 250 V DC, with 9' cutter bars.

Many other bargains too numerous to mention here.
Mail us your inquiries on any equipment you may need, and get our low prices.
Above prices subject to immediate inspection and prior sale.

COAL MINE EQUIPMENT SALES COMPANY

Frank J. Wolfe PHONE L.D. 34 Sheldon J. Wolfe
TERRE HAUTE, INDIANA

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BOUGHT AND SOLD

We carry a large stock of rebuilt and guaranteed transformers, and invite your inquiries.
Custom-built transformers and coils manufactured to your specifications.
Expert Repair Service—all makes and sizes of transformers rewound, repaired and redesigned. Ask for our price schedule.

THE ELECTRIC SERVICE CO., INC.

5331 Hetzel St. Cincinnati 27, Ohio
40 Years' Dependable Service

NEW DOUBLE DECKER
PICKING TABLES IN STOCK
WITH STAINLESS STEEL SLACK PLATES
Roller bearings
30" wide 7 foot screen 7 foot picking plate $900.00
36" wide 7 foot screen 7 foot picking plate $1050.00
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NEW SINGLE ROLL
COAL CRUSHERS IN STOCK
CRUSHES ¾" to 9"
18"..$300.00 24"..$375.00 30"..$450.00
42"..$600.00

RONALD L. PHILLIPS

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Immediate Delivery
200 Tons — 90 lb.
ARA Section RELAYING RAIL
with Angle Bars
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with Angle Bars
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RELAYING RAIL
Complete inventories of all weights Rails, Spikes, Bolts, Tie Plates and switching materials.
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STORAGE BATTERY

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1½ to 10 Tons 18" to 56½" Track Gauge.
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WORLD'S LARGEST INVENTORY

MOTORS—GENERATORS—TRANSFORMERS
New and Guaranteed Rebuilt
1 H.P. to 2500 H.P.
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Ironton Electric Locomotives

New and used
The Ironton Engine Company
Farmingdale, New Jersey

"OLD RELIABLE" IS OUR NICKNAME

Love that nickname! It means if you want the best in dependable mining equipment for the least money J. T. FISH is the firm to do business with. THEN, too, if you have something to sell—mines, plants, tipples, loaders, cutters, rail, copper—J. T. FISH is always in the market at fair prices the year-round.

WE OWN WHAT WE ADVERTISE

All types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc. Includes

1—Jeffrey 29U rubber tired Cutter.
1—Joy Continuous Miner, low vein.
2—14 BU low pedestal Loaders, 10 H.P. motors, type 7AE.
2—14 BU mod. pedestal Loaders, 10 H.P. motors, 7BDE.
2—14 BU, 3 PE, mod. pedestal Loaders, 7½ H.P. motors.
1—12 BU, 9E latest type Loader.
3—8 BU Loaders, one 33½" high.
2—11 BU Joy Loaders, hi capacity.
3—Joy T2-5 Cat Trucks, low pan. 1—T2-6.
1—Joy T1 Standard Cat Truck.
1—Goodman 20" Belt Conveyor, 1000' centers.
2—Joy 30" Belt Conveyors, 1000' & 2000' centers. Like new.
4—Joy 11B low vein Cutting Machines, 35 & 50 H.P.
6—Jeffrey 35L Cutting Machines, 250 volt DC. Perfect.
2—Joy 6 SC four wheel drive Shuttle Cars, rebuilt. Elevated discharge.
2—Joy 5 SC four wheel drive Shuttle Cars.
5—42E Shuttle Cars, as is or rebuilt.
10—32ES Shuttle Cars, as is or rebuilt.
4—Joy PLH-14 Elevating Conveyors, rebuilt.
2—Joy Belt Feeders PL12.
3—Myers Whaley No. 3 Automat Loaders.
Jeffrey L-500 Loaders.
Goodman 360 Loaders.
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General Electric & Westinghouse Rotary Converters & M.G. Sets, 100 to 300 KW latest types.
2 Ea. G.M.C., Cummins, & Superior 75, 100, & 125 KW Diesel Plants, 250 DC volts.
6—Goodman 512 EJ Cutting Machines.
7—Goodman 312 low vein Cutting Machines. Like new.
3—Baby Goodman 212AA Cutting Machines.
Jeffrey 35L, 35B, 29C, 29L Cutters.
50 Locomotives of all types in stock.
6—8000 Gal. Storage Tanks, like new.
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5—Low vein Water Cars, like new.
150 Mine Cars, Drop Bottom & End Dump, 42", 44" & 48" track gauge.
1000 G.I. 5 Gal. Gas & Water Cans.
Transformers, all sizes and voltages.
Joy and Jeffrey 12" & 15" Chain Conveyors.
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16 Yd. Dragline Bucket.
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50 Tons Copper Trolley & Feeder Wire, all types.
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Stationary Motors, AC and DC.
300 H.P. Natural Gas Engine.
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Thousands of other items

We Buy — Sell — Trade ***Send Us Your Inquiries***

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FOR SALE
MINE EQUIPMENT

MINE CARS—Composite Wood-Steel, 42" Track Gauge, 14" Wheels, End Dump—30½" High Over Rail. Capacity 52.5 Cu. Ft. Level Fall.
LOCOMOTIVES—6 to 15 Ton 42" Track Gauge, 250 volts. Jeffrey, Goodman, General Electric and Westinghouse.
MINING MACHINES—SHORTWALL. No Trucks. 6-foot Cutter Bar 250 Volts D. C. Permissible. Jeffrey 35B, Goodman, Universal and Standard.
CONVEYORS — Chain and Shaking. Permissible Motors and Controls 250 volts D.C.
HOISTS—Brown-Fayro. Slow Speed, 250 volts Permissible Motors.
ELECTRIC MOTORS—1 to 50 H.P. 250 volts D.C. Permissible. 440 volts A.C.
PUMPS—9" x 6" Triplex Deming—4" x 6" Triplex Scranton
COAL DRILLS—Jeffrey A-7. 250 Volts, Permissible.
SHAFT HOIST—Vulcan, Cylindro-Conical. Drum 7' to 9' Grooved for 1¼" Rope. 500 H.P. 2300 Volts, A.C. Motor. Shaft 225' Deep.
BRADFORD BREAKER—12' x 19' Pennsylvania Crusher Company. Complete with Chutes and Housing.
LOADING BOOMS—60" Apron Type.
VIBRATING SCREENS—Jeffrey-Traylor.
RE-LAYING RAIL—40# and 80# with Bars.
WHEEL PRESS—200 ton Hydraulic.
MACHINE CABLE—#4, 3-conductor flameproof.

Large Stock of Mine Supplies and Repair Parts

HILLMAN COAL & COKE COMPANY

JEROME MINE
JEROME, SOMERSET COUNTY, PENNA.

OR

HILLMAN COAL & COKE COMPANY
1914 Grant Bldg., Pittsburgh 19, Penna.

—FOR SALE—

One—Joy 38BH Vertical Rotary Drill electrically driven, 4000 Volts AC on high tension side with built in transformers down to operating voltage. Drills 7⅝ inch hole. Can be inspected under operating conditions.

COMPASS COAL COMPANY
Box 472, Clarksburg, W. Va.
Phone: Clarksburg 4-5681

CAT TRUCKS

1—Goodman Type RHT-2 Cat Truck, 250 volts DC, like new.
1—Joy T-2 Cat Truck, 250 volts DC.
1—Goodman Cat Truck, 220 volts AC.
2—Joy T-1 Cat Trucks, 250 volts DC.
1—Goodman MAT Cat Truck, 250 volts DC.

CONVEYORS

1—Joy 30" Belt Conveyor, 850 ft. centers. Belting is 4 ply, 32 oz. duck. Conveyor used very little, and is like new.

COPPER

Several thousand feet of 1000 MCM weatherproof in lengths 300' to 500' wrapped on reels.
Several thousand feet of 750 MCM weatherproof in long lengths, wrapped on reels in perfect condition.
Approximately 30,000' 1000 MCM Bare, wrapped on reels, lengths 500' to 1000'. Just as good as new.
Approximately 50,000' 500 MCM bare, wrapped on reels, lengths 500' to 1000'. Like new.
Several thousand feet 6/0 Fig. 8 Trolley wire, long lengths.
Several thousand feet 4/0 Fig. 8 Trolley wire, wrapped on reels and coils. Like new.
Several thousand feet 3/0, 3/cond. armored steel, lead covered, 2300 volts to 5000 volts.
Several thousand feet 1/0, 3/cond. Trenchlay, 2300 volts, like new, in lengths 500' to 1000'.
Several lengths from 300' to 400' each 4/0, 3/conductor, rubber covered, armored drill hole cable. Perfect condition.

CRUSHERS

1—36 x 30 Jeffrey Flextooth Crusher.
2—36 x 36 Jeffrey Single Roll in perfect condition.
1—24 x 48 McNally-Pittsburgh Double Roll, used 30 days, with steel base and V-Belt pulleys.
1—24 x 24 Jeffrey Single Roll.
1—24 x 24 McNally-Pittsburgh Single Roll stoker crusher, perfect condition.
1—24 x 24 Webster Single Roll in perfect condition.
1—24 x 20 Jeffrey Flextooth.

FANS

1—30" Jeffrey 8H-30 Aerodyne Fan, like new.
3—5' Jeffrey Aerodyne fans, late, new in 1948.
1—6' Joy fan, bought new in 1948.
1—4' Jeffrey Booster fan, propeller type.

DRILLS

3—#580 Chicago Pneumatic DC Drills with TDA650 arms. Two mounted on rubber, one on Cat Truck. In perfect condition.

LOADING MACHINES

5—11BU Joy Loaders, type 10APE, 250 volts, DC.
1—8BU-11E Joy Loader, 250 volts, DC.
2—8BU Joy Loaders, 220 volts, AC.
2—8BU Joy Loaders, 250 volts, DC.

LOCOMOTIVES

9—15 ton Jeffrey, type MH 77, ball bearing motors, air brakes, 42" gauge, new in 1946, new type resistance, locomotives are as good as new. Overall dimensions: length 14'7", width 5'2", height from rail 40", outside armor steel frame 3½". Can be made 36" gauge.
5—15 ton Goodman, type 36-A-04C, 42" gauge, ball bearing motors, overall dimensions: length 14'7", width 5'2", height from rail 40", outside armor steel frame.
2—15 ton Jeffrey, type MH 74, ball bearing motors, 42" gauge, outside armor steel frame, overall dimensions: length 14'7", width 5'2", height from rail 40".
1—10 ton Jeffrey, type MH 143, ball bearing motors, ball bearing journals, 42" gauge, late type.
50—6 ton Jeffrey MH 88, ball bearing motors, complete with gathering reels and new type steel resistance, 42" gauge, overall dimensions: length 13', width 48", height from rail 29". Locomotives in perfect condition, ready to go to work without spending a cent on them.
25—6½ ton Mancha battery locomotive, complete with practically new Gould and Eride batteries, 48 cells with 27 and 29 plates. Batteries have been fully charged, and some used less than 6 months. Overall dimensions: length 12', width 60", height from rail 42", height of battery box only 29". We can make a special price for either the complete locomotive with the batteries, or the batteries alone.

Also many 5 to 12 ton Jeffrey and Goodman locomotives in gauges from 36" to 48".

MINING MACHINES

1—10 BU, 250 volts, DC, late, in perfect condition.
4—512 EJH Goodman, 250 volts, DC, 8½' cutter bars, with hydraulic jacks and bug dusters, complete with Joy T1 Cat Trucks.
3—512DJ2A Goodman, 250/440 volts, AC, 8½' cutter bars, with Joy T1 Cat trucks.
6—7B-1 Sullivan, 250 volts, DC, 8½' cutter bars, complete with Bug dusters, permissible, with Joy T1 Cat Trucks.
1—512 EJ Goodman, 250 volts DC, 8½ ft. cutter bar, complete with Goodman bug duster, and Goodman MAT Cat Truck.

MOTOR GENERATOR SETS

1—300 KW Ridgeway, 2200 volts, 250 or 275 volts, DC, 1200 RPM, complete with switchboard.
4—200 KW Allis-Chalmers, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with automatic reclosing circuit breaker and manual starter.
2—200 KW General Electric, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.
1—200 KW Westinghouse, 2200 volts, AC, 275 volts, DC, 900 RPM with automatic circuit breaker for DC and manual starter for AC.
5—150 KW Westinghouse, 2200 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.
1—150 KW General Electric, 2300 volts, AC, 275 volts, DC, 1200 RPM, complete with fully automatic switchboard.

GAVENDA BROTHERS, Inc., Canton, Ill.

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All 250 Volts DC

3 Joy 5SC Shuttle Cars
4 Joy 6SC Shuttle Cars 32"
3 Joy 7SC Shuttle Cars
2 Jeffrey 66A4T Shuttle Cars
6 Jeffrey 65A4S Shuttle Cars
6 Jeffrey 65C Shuttle Cars
3 Jeffrey 70 URA Cutters
2 Jeffrey 35 L Cutters
2 Jeffrey Utility Trucks

1 Plymouth Gasoline Driven Locomotive 42" Ga. Also: Jeffrey 35BB-29UC-29U Track Mounted cutters—Trolley and Battery tractors—Battery Trikes—Chargers and other equipment.

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Locomotives, 7, 25, 44, 65 tons, gas, diesel.
9-Monighan Walking draglines, 2 to 12 yds.
Page 10-yd. diesel Walker dragline 152' bm.
Power shovels, 1½ to 25 yds., elec., diesel.
Rotary dryers, kilns: 8x125, 7x125, 54"x40'.
Dredges, hydraulic, 20", 18", 14", 10".
Euclid 25-ton bottom dump coal haulers (5).
Motor scrapers, diesel, 17 yds. (4).

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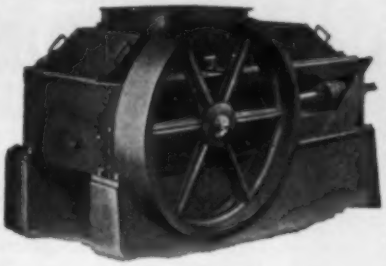


COAL CRUSHERS

1—18" x 18" Jeffrey single roll
1—24" x 24" Jeffrey single roll
1—24" x 36" McNally-Pittsburg double roll
1—36" x 42" double roll
1—30" x 16" Williams pulverizer
1—36" x 48" Jeffrey hammermill

TUGGER & SLUSHER HOISTS

1—5 HP Brownie room hoist
1—5 HP Sullivan RH room hoist
1—7½ HP Sullivan double drum slusher hoist
2—10 HP Sullivan 3 drum slusher hoist
1—Ingersoll-Rand mod. 6HC air tugger hoist
2—6½ HP Sullivan tuggers, 250 v. DC
7—6¼ HP Sullivan double drum, 250 v. DC
1—10 HP Sullivan double drum driven by Continental gasoline engine

BOX CAR LOADERS

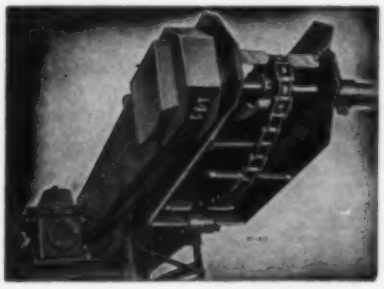
3—Ottumwa 20 HP box car loaders
2—Manierre 22 HP box car loaders
1—Jeffrey 20 HP box car loader
2—Red Devil portable loaders, 12'x15"
1—Card portable loader, 11'x19"

SCRAPER CONVEYORS

1—Link Belt, 50' centers, 12" flights
1—Jeffrey, 75' centers, 9" flights
1—Jeffrey, 67' centers, 30" flights
1—Jeffrey, 70' centers, 30" flights
1—Jeffrey, 72' centers, 30" flights
1—Jeffrey, 88' centers, 36" flights
1—Jeffrey drag, 28' centers, 9" drags
1—Jeffrey drag, 26' centers, 30" drags

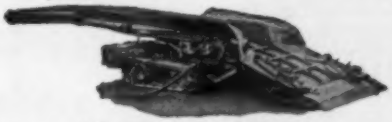
ROTARY DUMPER

1—Card rotary car dumper, 13'x5' platform



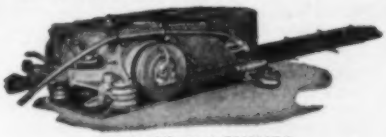
ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box Single Drum Hoist, 800 FPM with 375 HP GE Slipring Motor, 575 RPM, complete with controller, grids and magnetic contact panel.
1—600 HP Box Single Drum Hoist, 25,000# Rope Pull, 900 FPM, Hydraulic Post Breaks with 600 HP Westinghouse Slipring Motor, 435 RPM, controls and magnetic contact panel.



LOADERS & CONVEYORS

1—8BU Joy loader
1—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
6—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills



MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutter
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

SCREENS

5—3'x5' Tyler "Hummer" electric vibrating screen
1—42"x72" Jeffrey-Traylor electric vibrating screen
1—48"x84" Jeffrey-Traylor electric vibrating screen
1—40"x100" Tyler-Niagara 2 deck shaking screen
2—4'x12' Tyler Ty-rock 3 deck shaking screen
1—2 deck shaking screen, 18'x86"
1—4 deck shaking screen, 32'x84"

PIT CARS

125—60 cu. ft. Card steel coal mine cars 36" ga.
88—66 cu. ft. Card steel coal mine cars 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

RAIL

We have in stock good relaying rail, 16# to 90# also new 16# to 20# with fittings.

STORAGE BINS

2—50 ton capacity steel bins

CAGES AND HEAD SHEAVES

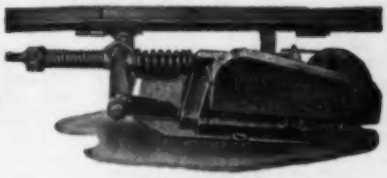
2—Card automatic self-dumping cages, 5'4" x 9'6" platform
2—108" Card bicycle sheave wheels
2—96" wood filled sheaves
2—84" Card bicycle sheave wheels
3—72" bicycle sheave wheels

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne fans
1—7' Jeffrey Aerovane 2 stage fan
2—Jeffrey #61 exhaust blowers
7—Jeffrey Aerodyne midget blowers
1—2600 cfm Brown-Fayro exhaust blower
2—3000 cfm Claridge exhaust blowers

PICKING TABLES

1—Link-Belt, 20' centers, 18" pans
1—Card, 41'6" centers, 30" pans
1—Card, 51' centers, 48" pans
1—73' centers, 30" pans
1—64' centers, 48" pans



ELEVATORS

1—Link-Belt, 42' centers, 6"x4" buckets, single chain, complete with steel housing
1—Link-Belt, 36' centers, 18"x8" buckets, double chain
1—12' centers, 14"x7" buckets on belt
1—35' centers, 10"x5" buckets on belt

BELT CONVEYORS

1—Jeffrey 24"x13'
1—Barber-Greene, 24"x66'
1—Barber-Greene, 24"x135'
1—Barber-Grene, 30"x173'

LOCOMOTIVES

1—2 ton Whitcomb, battery, 24" ga.
2—2½-3½ ton Mancha battery, 24" ga.
1—4 ton Westinghouse-Baldwin battery, 24" ga.
1—4 ton Ironton, battery, 36" ga.
2—7 ton G.E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton battery, 36" ga.
2—8 ton G.E. battery, 36" ga.
2—8 ton Goodman battery, 36" ga.
4—10 ton Atlas battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.

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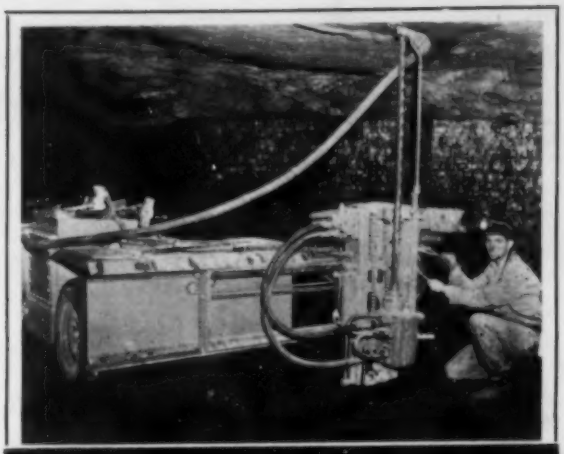

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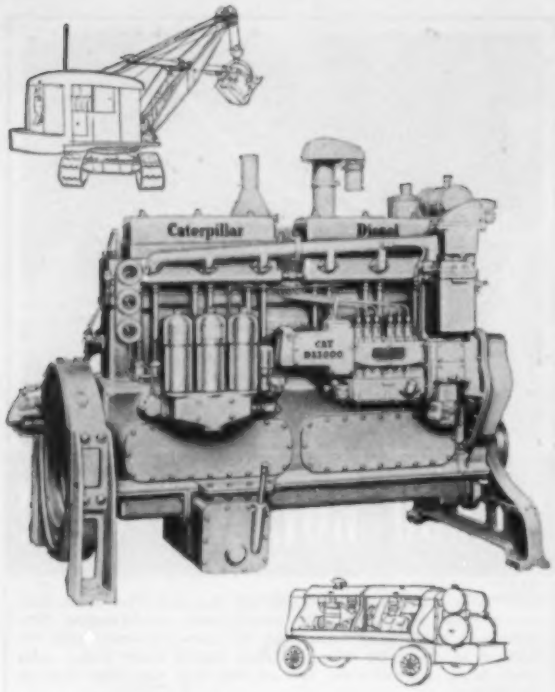

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NEW Oil Pump—features not just one, but two pressure controls to assure correct lubrication for all moving parts from the first turn of the crankshaft.

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In the new D13000, you get 21% more brake horsepower. Its governed speed, raised to 1200 r.p.m., provides greater versatility and productive capacity. While keeping outstanding, time-tested parts, it adds advanced design features to set new standards of stamina, dependability, economy and long life. And its wide variety of matched accessories and attachments makes it readily adaptable for any need.

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D13000—
A NEW STANDARD OF DIESEL POWER

World's most mechanized belt-equipped mine uses "U.S." Belts

VIEW OF INBY 42" U.S. GIANT secondary haulage belt discharging onto 48" transfer belt feeding 48" main haulage belt.

43" U. S. GIANT MAIN HAULAGE BELT. The crosswise flexibility of nylon construction enables belt to trough and train properly.

The No. 10 Mine of the Peabody Coal Co., Illinois, has a daily capacity of 12,000 tons. It's one of the most highly mechanized belt-equipped mines in the world.

In the pioneering and design of this great installation, United States Rubber Company engineers played an important part. "U. S." manufactured the main haulage belt, a 48" U. S. Giant® with nylon construction. It has handled peaks as high as 2400 tons per hour with no spillage. "U. S." also made the 48" transfer belt, as well as many of the 36" gathering conveyor belts, plus the two 42" secondary haulage belts. All in all, the total footage of "U. S." belt in this mine is more than 50,000 feet.

This Peabody Mine job is an example of Three-Way Engineering, a "U. S." technique which has proved outstandingly successful on thousands of materials handling jobs, large and small. In Three-way Engineering, "U. S." engineers work hand in hand with the designers of the conveyor system and the engineers of the mine. This is a positive, fool-proof way of obtaining the *right* belt construction for the particular job. Consult any of our 25 District Sales Offices, or write to address below.

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Inland Steel chooses Link-Belt's COMPLETE service for Price (Ky.) East Head House

WHEN Inland Steel wanted to improve their metallurgical coal, they called on Link-Belt. The result—a model coal preparation plant that produces a coal uniformly low in ash and sulphur. And the West Head House, which is a part of this plant, has also rendered excellent service. That's why, when Inland developed their East mine, Link-Belt was chosen to perform the overall engineering and equip the new East Head House.

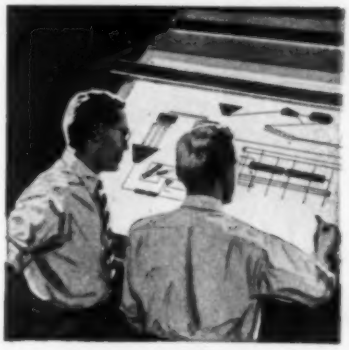
Link-Belt's complete service starts with a full quality equipment line . . . extends through entire design and erection responsibility. Thus, however large or small your requirements, you can leave all details to a single proved source with unequalled facilities. Car dumping, cleaning, drying, sizing, conveying—Link-Belt will supply what you need to produce a more marketable coal . . . at lowest possible cost per ton.

Without obligating you, our coal preparation specialist will gladly analyze your needs. Reach him through your nearest Link-Belt office.

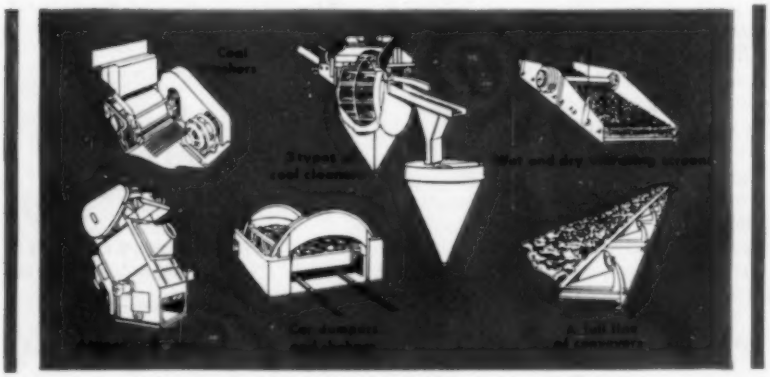
LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Birmingham 3, Cleveland 15, Denver 2, Detroit 4, Huntington 9, W. Va., Indianapolis 6, Kansas City 8, Mo., Louisville 2, Pittsburgh 13, Seattle 4, St. Louis 1, Wilkes-Barre, Scarboro (Toronto 13), Springs (South Africa). 13.671



OVERALL ENGINEERING. Vast experience of nation-wide design and field engineering staff integrates all factors, assures expert planning.



QUALITY EQUIPMENT. Link-Belt itself builds a broad line of coal preparation, handling and power transmission equipment.

COMPLETE ERECTION. Experienced erection superintendents, staffs and skilled crews carry through entire job down to last detail.